SHOUT
SHARE
IT

1592

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU
COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

DEUXIÈME SÉRIE.

N°. XXVI.

SMITHSONIAN INSTITUTION
DEC 7 1928
NATIONAL MUSEUM

DIE ORCHIDEEN VON JAVA
VON Dr. J. J. SMITH.
FÜNFTER NACHTRAG.

BUITENZORG,
IMPRIMERIE DU DEPARTEMENT.
FEVRIER 1918.

Prijs f 2.—

B976X
Bot

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU
COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

DEUXIÈME SÉRIE.

N°. XXVI.

DIE ORCHIDEEN VON JAVA
VON Dr. J. J. SMITH.
FÜNFTER NACHTRAG.

BUITENZORG,
IMPRIMERIE DU DEPARTEMENT.
FEVRIER 1918.

Prijs f 2.—

REGISTER

pag.
Aetheria javanica Lndl. 11
Agrostophyllum tenue J. J. S. 33
Bulbophyllum cornutum Rchb. f. 61
Bulbophyllum distans J. J S. 57
Bulbophyllum Epicrianthes J J. S. 51
Bulbophyllum gomphreniflorum J J. S. 70
Bulbophyllum hamatipes J J. S. 66
Bulbophyllum javanicum J. J. S. 51
Bulbophyllum obtusipetalum J. J. S. 59
Bulbophyllum peperomiifolium J J. S 55
Bulbophyllum rubiferum J. J. S. 73
Bulbophyllum scotiifolium J J. S 53
Bulbophyllum submarmoratum J. J. S. 68
Bulbophyllum tjadasmalangense J. J. S. 49
Bulbophyllum Winckelii J. J. S. 63
Calanthe chrysoglossoides J. J. S. 15
Callista excavata O K. 37
Callista gracillis O. K. 37
Ceratostylis subulata Bl. var. flavescens J. J. S 36
Chroniochilus J. J S 81
Chroniochilus tjidadapensis J. J S. 82
Cymbidium aloifolium aut. 76
Cymbidium simulans Rolfe. 76
Cyrtosia altissima Bl 9
Cystorchis javanica Bl. 11
Cystorchis variegata Bl. var. *purpurea* Ridl. 11
Dendrobium excavatum Miq. 37
Dendrobium exsculptum T. et B var. purpureum J. J. S. 39
Dendrobium gedeanum J. J. S. 37
Dendrobium gracile Lndl. 37
Dendrobium Jacobsonii J. J. S. 41
Dendrochilum? Zollingeri Miq. 13
Ephippium cornutum Bl. 61
Epicrianthes javanica Bl. 51
Eria Koordersii J. J. S. 46
Eria tjadasmalangensis J. J. S. 43
Erythrorchis altissima Bl. 9
Etaeria javanica Bl. 11
Galeola altissima Rchb. f. 9
Haematorchis altissima Bl. 9
Hetaeria javanica Miq. 11
Iridorchis anceps O. K. 18
Lecanorchis Bl. 4
Lecanorchis javanica Bl. 6
Lecanorchis javanica J. J. S. 8
Lecanorchis multiflora J. J. S. 8
Lecanorchis pauciflora J. J. S. 6

	pag.
Lectandra parviflora J. J. S.	76
Lectandra pauciflora Schltr.	76
Liparis angustiflora J. J. S.	31
Luisia antennifera Bl.	100
Malaxis anceps Rchb. f.	18
Microsaccus affinis J. J. S.	111
Microsaccus brevifolius J. J. S.	111
Microstylis cuprea J. J. S.	23
Microstylis foetida J. J. S.	28
Microstylis lobatocallosa J. J. S.	19
Microstylis longidens J. J S.	25
Microstylis purpureonervosa J. J. S.	21
Microtatorchis Schltr.	113
Microtatorchis javanica J. J. S.	115
Microtatorchis papillosa J. J. S.	117
Nervilia Winckelii J. J. S.	1
Oberonia anceps Lndl.	18
Oberonia Griffithii Wight.	18
Oberonia imbricata Wight.	18
Oberonia imbricatiflora J. J. S.	18
Oberonia nitidicauda J. J. S.	15
Onychium gracile Bl.	37
Oxystophyllum excavatum Bl.	37
Phalaenopsis javanica J. J. S.	77
Phyllorchis cornuta O. K.	61
Phyllorchis javanica O. K.	51
Poaephyllum parviflorum Ridl.	76
Saccolabiopsis J. J. S.	93
Saccolabiopsis Bakhuizenii J. J. S.	93
Saccolabium galbinum J. J. S.	97
Sarcanthus flaccidus J. J. S.	107
Sarcochilus fraternus J. J. S.	85
Taeniophyllum Bl.	119
Taeniophyllum aurantiacum J. J. S.	129
Taeniophyllum Bakhuizenii J J. S.	125
Taeniophyllum djampangense J. J. S.	123
Taeniophyllum hirtum Bl.	134
Taeniophyllum proliferum J. J. S.	121
Taeniophyllum radiatum J. J. S.	127
Taeniophyllum rostellatum J. J. S.	132
Thrixspermum batuense J. J. S. var. javanicum J. J. S.	91
Thrixspermum roseum J. J. S.	88
Trichoglottis lanceolaria Bl. var. *maculata* J. J. S.	106
Trichoglottis maculata J. J. S.	106
Trichoglottis Winkleri J. J. S. var. minor J. J. S.	102

DIE ORCHIDEEN VON JAVA

VON

Dr. J. J. SMITH.

Fünfter Nachtrag.

* **Nervilia Winckelii** J. J. S. n. sp.

Tuber subglobosus, depressus, sectione transversa ovalis, c. 5nodis, albidus, c. 2 — 2.2 cm. longus, 1.8 cm. latus, 1.5 — 1.6 cm. crassus. Caulis hypogaeus verticalis, c. 3 — 4 cm. longus, albidus, apice epigaeo purpureo-suffusus, vaginis donatus, post florescentiam apice 1folius, vagina tubulosa acuta mox exarescente c. 1.8 — 2.4 cm. longa ad basin folii, e nodis stolones elongatos tenues pilosos albos soli expositos dilute purpureo-punctatos vaginis tubulosis tenuiter membranaceis donatos 13 cm. superantes emittens. Folium petiolatum, ambitu suborbiculare, basi alte cordatum, breviter 5 — 7angulato-lobatum, lobis obtusis intermedio triangulo subacuto, lobis basilaribus approximatis vel plus minusve tegentibus late rotundatis, nervis c. 7 — 9 leviter curvatis supra sulcatis subtus carinatis, nitidum, novellum pulchre purpureum, deinde viride, basi purpurascens, subtus opacum et paulo pallidius cum nervis ad basin purpureis, c. 3.6 — 5.2 cm., cum lobis basilaribus c. 5 — 7.5 cm. longum, 5 — 7.5 cm. latum; petiolus late canaliculatus, prominenter costatus, purpureus, c. 1.7 — 4 cm. longus. Inflorescentia solitaria, erecta, 1flora, pedunculo tereti, albido, longitudinaliter tenuiter purpureo-striolato, c. 5 — 9.5 cm. longo, vaginulis c. 5, tubulosis, superne apertis, colore pedunculi, superioribus accrescentibus ad c. 3.3 — 3.5 cm. longis. Bractea erecta, oblongo-triangula vel triangula, acuta, concava, minute longitudinaliter purpureo-striolata, c. 0.4 — 0.55 cm. longa. Flos conspicuus, paucos dies viriditatem tenens, sepalis petalisque pallidis, vix flavescenti-virescentibus, striolis et maculis purpureis tenuibus longitudinalibus seriatis notatis. Sepalum dorsale lineari-lanceolatum, acutissimum, concavum, nervis 3 intus leviter sulcatis dorso prominulis, ad c. 3.3 cm. longum, 0.5 cm. latum. Sepala lateralia oblique lineari-lanceolata, acutissima, concava, nervis sepali dorsalis, ad 3.2 cm. longa, 0.35 cm. lata. Petala subobliquе lineari-lanceolata, acutissima, leviter concava, 1nervia, ad 3.1 cm. longa, 0.325 cm. lata. Labellum porrectum, 3lobum, lobis lateralibus incurvis marginibus inferne contiguis gynostemium amplectens, supra basin semigloboso-ventricosam constrictum, subtus longitudinaliter sulcatum, margine et intus minute papillosum, canalicula longitudinali costis 2 convexis papillosis in lobum medium breviter decurrentibus intus inter lobos laterales, canalicula in lobo medio dilatata cum costa longitudinali satis conspicua, explanatum ambitu oblongo-obovatum, supra basin dilatatam excavatam constrictum et cuneatum, album, lobo medio purpureo-maucultum, seriebus 2 macularum purpurearum paulum inter lobos laterales decurrentibus, ad c. 3.35 cm., usque ad apicem loborum lateralium 1.8 cm. longum, ad lobos laterales 1.5 cm. latum; lobi laterales trianguli, obtusi, margine antico truncati et irregulariter marginati, concavi; lobus intermedius porrectus, suborbicularis, obtusus, concavus, c. 1.5 cm. longus et latus. Gynostemium clavatum, dorso ad apicem convexo-incrassatum, dimidio inferiore subtus puberulo-papillosum, album, apice pallide purpureo-maculatum, basi virescenti-flavescenti-suffusum, ad c. 1.65 cm. longum, filamento lineari, clinandrio alte excavato. Anthera magna, cucullata, antice visa transverse ovali-quadrangula, dorso retusa, apice in rostrum breve latum obtusum recurvum producta, utroque latere valde divergenti cariniformis, alba, rostro macula purpurea ornata, carnosula, c. 0.42 cm. lata, thecis parvis. Pollinia 2, contigua, curvata, linearia, pallide flavescentia, c. 0.375 cm. longa, massulis inaequaliter biserialibus. Stigma majusculum, subobovatum. Ovarium subsessile, obconicum, 6sulcatum, viridi-purpureum, c. 0.5 cm. longum.

Java: Priangan, Panjairan bei Tjibeber, in c. 1000 m ü. d. M., auf einem Hügel im Halbschatten, zwischen *Paphiopedilum javanicum* Pfitz. u. s. w. (D. van Mullem, im Jahre 1905). Ebenda, Tjadas Malang, in c. 1000 m ü. d. M., im Walde; hier sehr allgemein. (W. F. Winckel, bl. im August und September 1916). Ebenda, Goenoeng Beser, im Urwalde, in c. 1000—1200 m ü. d. M.; stellenweise viel. (R. C. Bakhuizen van den Brink, bl. im August—Oktober 1917). Ebenda, Tjoeroek Djangot, in c. 900 m ü. d. M., im Urwalde. (W. F. Winckel, bl. im

Oktober 1916). Kedoe, Goenoeng Menjir, nordwestlich vom Telomojo, in 1200 m ü.d.M., im dunklen, humusreichen Walde. (W. Docters van Leeuwen n. 353, bl. im Oktober 1911). Garoet, Kawah Kamodjan in 1310 m ü.d.M., im Urwalde. (W. Docters van Leeuwen n. 2409, bl. im September 1916).

Diese Pflanze war mir schon viele Jahre bekannt, als ich 1916 von Herrn Winckel schönes, lebendes Material erhielt, das mich in die Lage stellte die Art zu beschreiben.

Sie ist nahe verwandt mit *N. punctata* (Bl.) Schltr., von der sie sich u. m. unterscheidet durch die bedeutend grösseren Blüten und die kurzen, stumpfen Seitenlappen der Lippe. Wahrscheinlich giebt es noch mehrere Unterschiede; die Blumesche Art wurde jedoch mit Sicherheit nicht wiedergefunden, wiewohl sie auch für Sumatra und Borneo angegeben wird und ich ähnliche Pflanzen von Java und Neu-Guinea in Kultur gehabt habe.

Nach der Ruheperiode in der trocknen Zeit bildet *Nervilia Winckelii* zunächst einen einzigen Blütenstand, dessen hübsche Blüte sich mehrere Tage hält. Früchte habe ich bis jetzt nicht beobachtet, und weiss daher nicht, ob sich der Pedunculus nach der Fruchtansetzung verlängert, wie bei einigen verwandten Arten der Fall ist. Nach der Blüte entwickelt sich das einzige Blatt, das anfangs eine eigentümliche, schön purpurne, bald verschwindende Färbung besitzt. Am unterirdischen Stengelteil entstehen dann, wie gewöhnlich, einige dünnen, beschuppten Ausläufer, die, im Gegensatz zu den anderen mir bekannten Arten, nicht zu einem neuen Knollen anschwellen, sondern sich an ihrem Ende kaum verdicken und sofort ein neues Blatt treiben. Erst die an diesem neuen Sprosse gebildeten Ausläufer verdicken sich an der Spitze zu einem wirklichen Knollen, der nach dem Welken der Blätter bis gegen das Ende des trocknen Monsuns im Boden ruhen bleibt.

Nervilia Winckelii J. J. S.

Knollen ungefähr kugelig, niedergedrückt, c. 5gliedrig, weisslich, c. 2 cm lang, 1.5—1.8 cm dick. Unterirdischer Stengel vertikal, 3—4 cm lang, mit Scheiden, nach der Blütezeit ein Blatt bildend, an den Knoten verlängerte, dünne, behaarte, weisse, c. 13 cm und mehr lange, mit einigen röhrigen, häutigen Scheiden versehene Ausläufer treibend. Blatt gestielt, im Umriss ungefähr rund, am Grunde tief herzförmig, kurz 5—7eckig-lappig, die Lappen stumpf, nur der mittlere ziemlich spitz, die Fusslappen genähert oder einander mehr oder weniger überdeckend und breit abgerundet, mit 7—9 schwach gebogenen, oben gefurchten, unten gekielten Nerven, glänzend, anfangs schön purpurn, bald grün, c. 3.6—5.2 cm, mit den Fusslappen 5—7.5 cm lang, 5—7.5 cm breit; Stiel rinnig, kantig, c. 1.7—4 cm lang. Blütenstand einzeln, 1blütig; Pedunculus weisslich, fein purpurn längsstreifig, c. 5—9.5 cm lang, mit c. 5 röhrigen, wie der Pedunculus gefärbten, bis 3.5 cm langen Schaftblättern. Braktee dreieckig, spitz, konkav, fein purpurn gestreift, 0.4—0.55 cm lang. Blüte schön, sich einige Tage haltend. Sepalen und Petalen linear lanzettlich, sehr spitz, konkav, blass, schwach gelbgrünlich gefärbt, mit zahlreichen feinen, purpurnen Längsstreifchen und Fleckchen, die Sepalen 3nervig, 3.3 cm lang, 0.5 und 0.35 cm breit, die Petalen 1nervig und etwas kleiner. Lippe um die Säule gerollt, 3lappig, über der halbkugelig bauchigen Basis eingeschnürt, unten mit einer Längsfurche, innen und am Rande klein papillös, innen zwischen den Seitenlappen mit einer von 2 konvexen, papillösen Längsleisten begrenzten, auf dem Mittellappen verbreiterten und dort von einer ziemlich starken Längsrippe durchzogenen Längsrinne, weiss, der Mittellappen purpurn gefleckt, ausgespreizt bis c. 2.35 cm, bis zur Spitze der Seitenlappen 1.8 cm lang, über die Seitenlappen 1.5 cm breit; Seitenlappen kurz, dreieckig, stumpf, am Vorderrande abgestutzt und unregelmässig berandet; Mittellappen vorgestreckt, nahezu kreisrund, stumpf, konkav, 1.5 cm lang und breit. Säule keulig, an der Spitze konvex verdickt, die untere Hälfte unten kurz behaart, an der Spitze blasspurpurn gefleckt, bis 1.65 cm, lang. Anthere kappig, vorn ungefähr queroval viereckig, beiderseits mit einem Längskiel, an der Spitze mit einem kurzen, breiten, stumpfen, zurückgebogenen Schnäbelchen, 0.42 cm breit. Pollinien 2, gebogen, linear, gelblich, 0.375 cm lang. Narbe gross. Fruchtknoten nahezu sitzend, verkehrt kegelig, 6furchig, grün und purpurn, 0.5 cm lang.

Lecanorchis Bl.

Durch die in den letzten Jahren von Herrn C. A. Backer in Java unternommenen Sammelreisen ist auch gutes *Lecanorchis*-

Material disponibel gekommen. Dadurch bin ich jetzt im Stande einige diese Gattung betreffenden Fragen näher zu beleuchten.

Nachdem ich früher in Alcohol konserviertes Material einer javanischen und ebenfalls einer aus Neu-Guinea stammenden *Lecanorchis* untersucht hatte, kam ich zum Schlusse, dass Blume, dem offenbar nur Knospen der L. *javanica* zur Verfügung gestanden haben (seine Zeichnung ist jedenfalls nur nach einer Knospe angefertigt), sich bei der Beschreibung geirrt haben müsste, was, gesehen die Zartheit der Blüten, leicht möglich war.

Von Herrn Backer wurde jedoch eine einzige Pflanze gesammelt, leider nur getrocknet, die, wie sich herausstellte, völlig mit der Blumeschen Beschreibung übereinstimmt. Wiewohl Blume dadurch rehabilitiert ist, bleibt es eine merkwürdige Sache, dass zwei so sehr verschiedene Blütentypen, innerhalb einer Gattung vorkommen würden. Man könnte dieselbe jedoch ungezwungen erklären durch anzunehmen, dass Blume ein pelorisches Exemplar vor sich gehabt hat. Um Sicherheit zu erlangen sollte mehr und besseres Material, auch von Malaka und Borneo, untersucht werden.

Unter dem übrigen, von Backer gesammelten Material fanden sich zwei scharf getrennte Arten.

Die eine, *L. multiflora* J. J. S., ist die nämliche Spezies, die ich (in Bull. Dép. Agric. Ind. Néerl. No. XLIII (1910), 1) als *L. javanica* beschrieb. Sie sieht *L. triloba* J. J. S. von Neu-Guinea, die ich später mit ihr vereinigte, sehr ähnlich; es ist aber vielleicht vorsichtiger die beiden Arten vorläufig geschieden zu halten, besonders da *L. triloba* nach einem sehr kleinen und schwachen Exemplar beschrieben wurde, dessen einzige Blüte nicht völlig unverletzt war.

Die zweite hier aufgestellte neue Art, *L. pauciflora* J. J. S., ist äusserlich der *L. javanica* Bl. völlig gleich, während die Blüten der beiden Arten gleich gross sind. Falls *L. javanica* Bl. eine pelorische Form ist, wie ich kaum bezweifle, so ist *L. pauciflora* zweifelsohne die normale Form.

Nach Schlechters die Gattung betreffende Mitteilungen (in Orch. D. Neu-Guinea 32) kommen auch in Neu-Guinea und anderswo mit *L. javanica*, *L. multiflora* und *L. pauciflora* korrespondierende Formen vor.

Es ist wünschenswert alle Arten genau mit einander zu vergleichen.

Einen Bestimmungsschlüssel der javanischen Arten lasse ich folgen.

1. Blütenstände wenigblütig. Lippe frei, ungeteilt, spatelig. *L. javanica* Bl.
   Lippe der Säule z. T. angewachsen, 3 lappig. . . . . . .2.
2. Blütenstände locker, wenig (5 — 7)blütig. Brakteen gewimpert. Blüten ziemlich gross. Lippe innen ohne Verdickungen. Fruchtknoten durch eine doppelte Einschnürung unterhalb des Aussenkelches gleichsam wie mit einem Knöpfchen versehen. Frucht am Grunde deutlich zusammengezogen. . . . . *L. pauciflora* J. J. S.
   Blütenstände ziemlich dicht vielblütig. Brakteen nicht gewimpert. Blüten ziemlich klein. Lippe innen mit 2 Verdickungen. Fruchtknoten unterhalb der Spitze nicht eingeschnürt. Frucht am Grunde kaum merkbar zusammengezogen. . . . . *L. multiflora* J. J. S.

Lecanorchis javanica Bl. (nec Schltr. nec J. J. S. p. p.) Mus. Bot. Lugd. Bat. II (1856), 188; Fl. Jav. Orch. (1858), 150, t. 63, f. 1; t. 66A; Miq. Fl. Ind. Bat. III (1855), 718; J. J. S. in Fl. Buit. VI, Orch. (1905), 62; Atlas, f. XI.

Java: Priangan, Megamendoeng. (Blume). Buitenzorg, Goenoeng Gede bei Djasinga, in 1000 m ü. d. M., zerstreut im Urwalde (C. A. Backer n. 10326, bl. im November 1913).

Lecanorchis pauciflora J. J. S. n. sp.

Planta saprophytica. Rhizoma ramosum, radicibus elongatis, patentissimis. Caules breves, teretes, vaginis brevibus, tubulosis. Inflorescentiae erectae, racemosae, apice laxe pauciflorae, pedunculo simplici, tereti, c. 30 cm. longo, vaginulis c. 3 distantibus basi tubulosis apice triangulis ciliatisque donato, rachide c. 4.5 — 6 cm., fructifera c. 10 cm. et plus longa. Bracteae adpressae, triangulae, acutae, concavae, ciliatae, dorso verruculosae, ad c. 0.6 cm. longae. Flores c. 5 — 7, vagi, cum ovario angulum obtusum vel subrectum facientes, teneri, c. 1.7 cm. longi, sepalis petalisque basi brevissime connatis, subparallelis, apice praesertim sepali dorsalis et

petalorum recurvis. Sepalum dorsale lineari-spathulatum, anguste obtusum, concavum, basi 3nervium, c. 1.8 cm. longum, bene 0.3 cm. latum. Sepala lateralia oblique spathulato-linearia, apice subobtusa en dorso verrucosa, concava, dorso subcarinata, c. 1.7 cm. longa, 0.3 cm. lata. Petala subspathulato-linearia, leviter acuminata, anguste subobtusa, concava, c. 1.8 cm. longa, bene 0.3 cm. lata. Labellum ungue oblongo concavo marginibus crasso c. 0.43 cm. longo bene 0.2 cm. lato gynostemio adnatum, 3lobum, concavum, fascia longitudinali lata puberula superne villosa, totum explanatum bene 1.5 cm. longum, mesochylio cuneato-quadrangulo, in lobos laterales dilatato, c. 0.54 cm. longo, basi fere 0.5 cm., superne 0.85 cm. lato; lobi laterales erecti, porrecti, gynostemium bene superantes, oblique trianguli, apice rotundati et irregulariter marginati, concavi, margine antico c. 0.2 cm. longi; lobus intermedius porrectus, apice recurvus, convexus, marginibus incurvus, rotundato-quadratus, eroso-dentatus, minute ciliolatus, c. 0.56 cm. longus, 0.575 cm. latus. Gynostemium basi labelli adnatum, clavatum, leviter curvatum, c. 0.97 cm. longum, apice obtusissimum, clinandrio magno, profundo, auriculis subrectangulis. Anthera magna, cucullata, antice visa quadrangula, postice valde producta et in clinandrium quadrans, basi 2loba, antice dilatata, c. 0.16 cm. lata. Cupula irregulariter et late c. 6dentata, dentibus irregulariter marginatis, bene 0.2 cm. diam. Ovarium pedicellatum teres, infra apicem et infra cupulam constrictum, c. 2.3 cm. longum. Capsula erecto-patens, sessilis, basi contracta, recta, 6sulcata, constrictione infraapicali bullam depresse globosam verrucosam formans, cupula irregulariter lobulata et crenata coronata, nitida, nigra, c. 3—3.5 cm. (etiam 2.5 cm.?) longa, rimis 6 dehiscens, valvis linearibus, basi apiceque connatis.

Java: Buitenzorg, Pasir Kempoel bei Nirmala in 1200 m ü. d. M., im Urwalde; viele Exemplare. (C. A. Backer n. 11084, bl. und fr. im Dezember 1913; n. 11032 bis, fr. im Dezember 1913). Gegerbintang, im Urwalde. (J. J. S., fr. im Juni 1906). Boerangrang am Nordhang, in 1500 m ü. d. M. im Walde zerstreut. (C. A. Backer n. 14307, bl. im Juni 1914). Ebenda in 1400—1500 m ü. d. M., im Urwalde auf einem Bergrücken, zahlreich. (C. A. Backer n. 1447, bl. und fr. im Juni 1914). Pekalongan, Goenoeng Prabota, in 1550 m ü. d. M., auf humusar-

mem Waldboden, viele Exemplare. (C. A. Backer n. 16003, fr. im September 1914).

Lecanorchis pauciflora J. J. S.

Saprophytisch. Rhizom verzweigt, mit verlängerten, weit abstehenden Wurzeln. Stengel kurz, stielrund, mit kurzen, röhrigen Scheiden. Blütenstände aufrecht, an der Spitze locker wenigblütig; Pedunculus stielrund, c. 30 cm lang, mit c. 3 am Grunde röhrigen, nach oben gewimperten Schaftblättern; Rachis c. 4.5 — 6 cm, in Frucht bis 10 cm und mehr lang. Brakteen dreieckig, spitz, konkav, gewimpert, aussen warzig, bis 0.6 cm lang. Blüten 5 — 7, mit dem Fruchtknoten einen stumpfen oder fast rechten Winkel bildend, c. 1.7 cm lang. Sepalen und Petalen parallel, an der Spitze etwas ausgebogen, linear spatelig, c. 1.8 cm lang, 0.3 cm breit. Lippe der Säule mit kurzem, länglichem, konkavem, am Rande verdicktem, c. 0.43 cm langem Nagel angewachsen, 3lappig, konkav, mit einem breiten, kurz behaarten, nach vorne zottigen Längsstreifen, ausgespreizt im ganzen c. 1.5 cm lang; Mesochyl mit den Seitenlappen keilig viereckig, c. 0.54 cm lang, an der Basis fast 0.5 cm, an der Spitze 0.85 cm breit; Seitenlappen vorgestreckt, die Säule weit überragend, schief dreieckig, mit abgerundeter, unregelmässig berandeter Spitze, 0.2 cm lang; Mittellappen vorgestreckt, an der Spitze zurückgebogen, abgerundet, vierkant, ausgefressen, sehr kurz gewimpert, c. 0.56 cm lang, 0.575 cm breit. Säule keulig, c. 0.97 cm lang. Anthere gross, vorn viereckig, nach hinten verlängert und in das Clinandrium hineinpassend, an der Basis 2lappig, c. 0.16 cm breit. Aussenkelch napfförmig, unregelmässig und breit c. 6zähnig, c. 0.2 cm breit, die Zähne unregelmässig berandet. Frucht aufrecht abstehend, sitzend, am Grunde zusammengezogen, unterhalb der Spitze eingeschnürt, der abgeschnürte Teil niedergedrückt kugelig und warzig, vom Aussenkelche gekrönt, glänzend, schwarz, c. 3 — 3.5 cm (auch 2.5 cm?) lang, in 6 lineare, an der Basis und Spitze verbunden bleibende Klappen aufspringend.

Lecanorchis multiflora J. J. S. n. sp. — *L. javanica* J. J. S. (nec Bl., nec Schltr.) in Bull. Dép. Agric. Ind. Néerl. No. XLIII (1910), 1.

Java: Banten, Goenoeng Malang, südöstlich von Pasaoeran an der Soenda-Strasse, in 400 m ü. d. M., viele Gruppen auf gut beschattetem Terrain. (C. A. Backer n. 7158, bl. und fr. im März 1913). Buitenzorg, Goenoeng Karang Gantoengan, in 900 —1000 m ü. d. M., 2 Exemplare im Urwalde. (C. A Backer n. 6275, fr. im Dezember 1912). Ebenda, Goenoeng Gede bei Djasinga, in 800—1000 m ü. d. M., sehr zerstreut im Urwalde. (C. A. Backer n. 10124, fr. im November 1913). Boerangrang am Nordhang, in 1000—1200 m ü. d. M., zahlreich im alten sekundären Walde. (C. A. Backer n. 14020, bl. und fr. im Juni 1914).

Bei dieser Pflanze sind die Wurzeln dicker als bei *L. pauciflora* J. J. S.

***Galeola altissima** Rchb. f. Xenia Orch. II, 77; J. J. S. in Fl. Buit. VI, Orch. (1905), 67; Atlas f. XLIV. — *Cyrtosia altissima* Bl. Bijdr. (1825), 396. — *Erythrorchis altissima* Bl. Rumphia I (1835), 200, t. 70; Miq. Fl. Ind. Bat. III (1855), 720. — *Haematorchis altissima* Bl. Rumphia IV (1847), t. 200 B.

Planta saprophytica, scandens, tota c. 2—3 m. longa. Caulis elongatus, ramosus, laxe et irregulariter serpentinus, glaber, sordidus, latere soli exposito purpurascens, initio dilute sordide flavus, c. 0.3—0.55 cm. diam., squamatus, internodiis c. 5—10 cm. longis, radicibus ad nodos solitariis, squamis oppositis, superioribus brevibus, inferioribus elongatis ramosisque. Squamae patentes, triangulae ad oblongo-triangulae, valde concavae, marginibus incurvae, colore caulis, c. 1—1.6 cm. longae. Inflorescentia magna, terminalis, laxe paniculata, valde multiflora, glabra, c. 60—95 cm. longa, ramulis ultimis c. 6—16 cm. longis, laxius multifloris, pedunculis partialibus c. 1.7—3 cm. longis, rachide angulata, flavo-sordida. Bracteae vagi, patentes, triangulae, acutae, concavae, colore rachidis, ad c. 0.27 cm. longae, superiores minores. Flores teneri, caduci, flavescentes. Sepalum dorsale oblongum ad lanceolatum, apice recurvulum, obtusum, concavum, supra basin 7nervium, c. 1.17—1.8 cm. longum, 0.4—0.5 cm. latum. Sepala lateralia oblique oblonga, interdum subsigmoidea, obtusa vel breviter acute apiculata, concava, c. 6nervia, c. 1.1—1.7 cm. longa, c. 0.4—0.5 cm. lata. Petala oblique spathulata ad lineari-subspathulata, plus minusve falcatula, obtusa, concava

cum fascia angusta longitudinali convexa, dorso convexa cum sulco longitudinali, 4nervia, c. 1.17 — 1.7 cm longa, basi c. 0.14 cm., superne c. 0.33 — 0.4 cm. lata. Labellum basi gynostemii brevissime adnatum, concavum, trilobum, fascia valida longitudinali lata convexo-incrassata in $^3/_5$ partibus supra basin constrictione transversa alta villosula interrupta, parte inferiore lineari-oblonga, superne vix constricta, apice paulo dilatata et bilobula, lobulis medio glabris exceptis villosula, callo apicali quadrangulo-ovato, superne decrescente et basin lobi intermedii vix attingente, late canaliculato, dimidio inferiore fuscescenti et medio excepto dense puberulo, pallide flavescens, intus in utraque incrassationis parte margine excepto densius irregulariter prominenter transverse sordide violaceo-rugosum, subtus convexum et ad constrictionem costae subventricosum, longitudinaliter sulcatum, explanatum ambitu cuneato-quinquangulare, totum c. 1 — 1.275 cm. longum, ad lobos laterales 0.9 — 1.1 cm. latum, lobis lateralibus incurvis, brevibus, late rotundatis, antice undulatis, lobo intermedio vix a lobis lateralibus sejuncto, marginibus incurvo, brevi, aequilateraliter trapeziformi, apice late bilobulo, crenato, undulato, subtus ad basin convexo, dilute citrino, c. 0.15 — 0.2 cm. longo, 0.5 cm. lato. Gynostemium leviter curvatum, clavatum, utroque latere costa longitudinali aliformi infra apicem terminante donatum, callo convexo sordide violaceo subtus ad basin, pallide flavescens, apice dilute flavum, c. 0.75 cm. longum, clinandrio alte excavato, apice obtuso. Anthera magna, cucullata, a dorso compressa, antice visa subovata, dorso rotundata, apicem versus paulo dilatata, truncata, basi reverse bilobula, pallide ochrascens, c. 0.16 — 0.17 cm. lata. Pollinia 2, a dorso compressa, oblique elliptica, basi fissa, subsemipellucida, dilute flava, c. 0.075 cm. longa. Rostellum latum, breve, truncatum, tenerum. Stigma late obverse triangulum vel semiorbiculare, margine membranaceo-dilatato Uformi partim saccato-obtectum. Ovarium sessile, teres, glabrum, c. 0.9 cm. longum. Fructus rectus, elongatus, basi apiceque brevissime contractus, c. 6.5 — 11 cm. longus, rimis 2 in valvas 2 valde inaequilatas c. 0.395 — 0.45 cm. et 1 — 1.1 cm. latas dehiscens. Semina numerosissima, minuta, orbicularia, ala membranacea plana suborbiculari apice rotundata et irregulariter dentata basi acutangule excisa et sagittato-producta circumdata, c. 0.1 cm. lata.

Java: Buitenzorg, Goenoeng Seriboe. (Blume, fr.). Buitenzorg, Djasinga. (Zippelius, fr.). Ebenda auf dem Goenoeng Maneuh in c. 450 m ü.d.M., im Urwalde auf Sandstein, 1 Exemplar. (C. A. Backer n. 9963, bl. im November 1913). Priangan. (Blume, bl. im August). Ebenda, Tjisokan bei Tjibeber, in c. 750 m ü.d.M., im Urwalde. (W. F. Winckel, im September 1916; steriel). Ebenda, Tjoeroek Djangot (Tjitjoeroek) bei Tjibeber, in c. 900 m ü. d. M., im Urwalde. (W. F. Winckel, bl. im Oktober 1917).

Neues Material hat mich in die Lage gestellt eine bessere Beschreibung zu liefern.

Nach Blume erreicht die Pflanze eine Länge von bis 40 m. Die oben erwähnten Exemplare sind nach den Notizen nur 2—3 m lang.

Die Beschreibung wurde nach ledendem, in Alkohol konserviertem und getrocknetem Material angefertigt, die der Früchte nach dem Blumeschen Original vom Goenoeng Seriboe.

***Cystorchis javanica** Bl. Fl. Jav. Orch. (1858), t.24, f. 1.— *C. variegata* Bl. var. *purpurea* Ridl. in Journ. Linn. Soc. XXXII (1894), 399; J. J. S. in Fl. Buit. VI, Orch. (1905), 93; Atlas (1908), f. LXIII.—*Etaeria javanica* Bl. Bijdr. (1825), 410.— *Aetheria javanica* Lndl. Gen. et sp. Orch. (1840), 490.— *Hetaeria javanica* Miq. Fl. Ind. Bat. III (1855), 725.

Caulis decumbens, elongatus, radicans, apice foliato c. 2.5—4.5 cm. longo adscendens, teres, glaber, pallide viridis, c. 25—30 cm. longus, post florescentiam ramum 1 emittens. Folia c. 5—6, oblique ovata, breviter acutata, crispula, 5nervia, costa media supra sulcata subtus prominente, ceteris minus conspicuis, membranacea, glabra, supra velutino-atrofusca, subtus pallidiora, c. 2.3—4.7 cm. longa, 1.65—2.75 cm. lata; petiolus canaliculatus, cum vagina tubulosa c. 1.3—1.9 cm longus. Inflorescentia erecta, apice dense pluriflora, pedunculo tereti, pubescenti, fuscescenti, c. 10—13.5 cm. longo, vaginulis 1—2 tubulosis acuminatis pubescentibus ad c. 1.2 cm. longis donato, rachide pubescenti, c. 2—3 cm. longa. Bracteae ovarium includentes, subovatae, longe acuminatae, concavae, dorso carinatae et pubescentes, rubicundae, c. 0.65—0.7 cm. longae, 0.25 cm. latae, superiores minores. Flores c. 10—12,

vagi, erecti, horizontales, c. 0.725—0.75 cm. longi, 0.35—0.45 cm. lati, sepalis subparallelis, dorso glanduloso pubescentibus, rubicundis, apice albidis, basi pallide virescentibus. Sepalum dorsale horizontale, e basi late ovata marginibus sepala lateralia contigua medio fere oblongo-contractum, apice recurvulum, obtusum, concavum, c. 0.475—0.57 cm. longum, 0.25 cm. latum. Sepala lateralia basi dilatata valde concava basin calcaris amplectentia, oblique ovata, medio oblongo-contracta, obtusa, concava, tota c. 0.63 cm., usque ad apicem ovarii 0.5 cm. longa, bene 0.3 cm., medio c. 0.2 cm. lata. Petala sepalo dorsali agglutinata, oblique lineari-oblonga, apice oblique subtruncata, dimidio exteriore convexo-incrassata et sulco longitudinali a latere interiore separata, margine exteriore papilloso-ciliolata, alba, stria longitudinali pallide viridi superne prope marginem exteriorem, c. 0.45 cm. longa, 0.15 cm. lata. Labellum calcaratum, parte inferiore ambitu late ovata concava gynostemio adpressum, marginibus ante gynostemium incurvis et in formam tubuli oblongi utrinque carnoso-incrassati inferne oblique constricti obtusi contiguis, subtus longitudinaliter sulcatum, basi album, infra medium rubicundum, ceterum pallidum, vix rubescens, papillosum, usque ad apicem ovarii c. 0.54 cm. longum, parte antica c. 0.16 cm. latum; calcar ovario parallelum deorsum spectans, basi utrinque in vesiculam decurvam compressam plica alta transversa instructam intus glandulam verruculosam grentem sepalis lateralibus obtectam inflatum, apice productum, liberum, lateraliter compressum, rotundatum, totum album, 0.27 cm. longum, ad vesiculas 0.23 cm. latum. Gynostemium breve, crassum, basi valde constrictum, album, c. 0.25 cm. longum, clinandrio magno, alte excavato. Anthera alte conico-cucullata, in rostrum recurvulum triangulum obtusum producta, c. 0.125 cm. longa. Pollinia 2, clavata, sulcata, sectilia, cum caudiculis et glandula majuscula supra glutinosa fere 0.2 cm. longa. Rostellum 3dentatum. Stigma faciem inferiorem gynostemii occupans, suborbiculare, margine inferiore truncatum, utrinque denticulo donatum. Ovaruim tortum, pubescens, fuscescens, costis 3 dilute viridibus sulcis 2 limitatis, c. 0.6 cm. longum.

Java: Buitenzorg, Goenoeng Seriboe. (Blume). Buitenzorg, Tjiampea, im Urwalde. (J. J. S.). Goenoeng Handjawoeng, in 800 m ü. d. M., im Walde. (C. A. Backer n. 6056, bl. im Dezember

1912). Goenoeng Soenarari, in 900—1000 m ü. d. M., an schattigen Stellen im Urwalde. (C. A. Backer n. 6382, bl. im Januar 1913). Auf dem Salak, bei Tegalangkop. (Sundanesischer Sammler, bl. im Februar 1912). Bei Tjigombong im Urwalde. (J. J. S., bl. im November 1899).

Nach Angabe auch Sumatra, Borneo, Malaka.

Diese Pflanze wurde von Ridley als eine Varietät der *C. variegata* Bl. betrachtet. Ich glaube jetzt, dass sie besser als eine eigene Art angesehen wird, wiewohl die Blüten einander sehr ähnlich sehen.

* **Dendrochilum? Zollingeri** Miq. Fl. Ind. Bat. III (1855), 626; J. J. S. in Rec. trav. bot. néerl. I (1904), 7; in Fl. Buit. VI, Orch. (1905), 652; Pfitz. et Krzl. in Pflanzenr., Heft 32 (1907), 91.—*D.* n. sp. Zoll. in Flora XXX (1847), 456.

Rhizoma validum, ramosum, teres, vaginatum. Pseudobulbi approximati, majusculi, sicco oblongo-ovoidei, c. 3.75—4.75 cm. longi, initio vaginis tubulosis amplectentibus opacis inferioribus brevibus obtusis superioribus acutis sicco dense nervosis deinde in fibras solutis ad c. 8.5 – 12 cm. longis inclusi. Folium petiolatum, lanceolatum, apice contractum, acutum, mucronatum, basi sensim in petiolum angustatum, nervis c. 3 majoribus in utraque parte costae mediae subtus obtuse prominentis, sicco firmiter papyraceum, c. 36—40 cm. longum, 2—2.9 cm. latum; petiolus canaliculatus, c. 11—14.5 cm. longus. Inflorescentia folio juvenili synantha, laxe multiflora, pedunculo apice in sicco punctato, c. 20—38 cm. longo, rachide nutante, quadrangula, c. 12.5—27 cm. longa, internodiis c. 0.275—0.5 cm. longis. Bracteae patentissimae, concavae, margine incurvae, subovatae, breviter acuminatae, acutae, basi latae, 3nerviae, sicco punctatae, c. 0.4 cm. longae, 0.2 cm. latae. Flores mediocres, patentissimi, sepalis petalisque pallide viridibus. Sepalum dorsale incurvum, lanceolatum, acutum, concavum cum lateribus convexis, 3nervium, c. 0.77—0.8 cm. longum, 0.2 cm. latum. Sepala lateralia oblique lanceolata, apicem versus sensim angustata, acuta, in utraque parte canaliculae longitudinalis convexa, dorso carinata, 3nervia, c. 0.7—0.75 cm. longa, 0.175 cm. lata. Petala oblique lanceolata, acuta, superne vix erosula, 3nervia, c. 0.63—0.7 cm. longa, 0.18—0.2 cm. lata. Labellum curvulum, oblongum, in $^2/_5$ partibus supra basin leviter constrictum, 3nervium, pallide virescenti-flavum, margine apicali flavo-brunneum, explanatum c. 0.43 cm. longum, hypochylio margine incurvo, subovali vel plus minusve quadrangulo, eroso-denticulato, costis 3 parallelis longitudinalibus basi conjunctis donato, costa intermedia quam laterales minore, c. 0.175 cm. longo, 0.15 cm. lato, epichylio (lobo intermedio) subovato, apice convexo, obtuso, c. 0.225—0.25 cm. longo, 0.15 cm. lato. Gynostemium curvulum, dorso convexum, subtus concavum, c. 0.3 cm. longum, ala apicali concava, oblongo-quadrangula, apice truncata, altius inaequaliter 4dentata, alis lateralibus magnis, porrectis, parallelis, basi lata insertis, oblique oblongo-triangulis, acutis, ala apicali vix brevioribus, pede abbreviato. Anthera cucullata, cordato-ovata, obtusa, connectivo gibboso-incrassato, c. 0.075 cm. lata. Pollinia 4, pyriformia. Rostellum majusculum, semiellipticum, obtusum. Stigma oblongo-quadrangulum, praesertim margine inferiore incrassatum. Ovarium 6sulcatum, cum pedicello brevi crassiusculo c. 0.22 cm. longum.

Java: Tengger, bei Nongko Djadjar. (M. Buysman); bei Kali Djadjang Woeloe in 860 m ü. d. M. (L. Mousset n. 1049); Andamansari (J. Kuijper, bl. im November 1915).

Wiewohl ich Zollingers Pflanze nicht gesehen habe und sie nach der Beschreibung laterale Blütenstände haben soll, halte ich diese Art für *Dendrochilum Zollingeri* Miq.

Sie ist verwandt mit *D. simile* Bl., vor dem sie ausgezeichnet ist durch lockerere Blütenstände, grössere, anders gefärbte Blüten, ein dickeres Blütenstielchen und die Form der Lippe, die an der Spitze nur etwas zurückgebogen, nicht zurückgerollt ist.

Beschreibung nach lebenden und getrockneten Exemplaren.

Dendrochilum Zollingeri Miq.

Rhizom kräftig, verzweigt, mit Scheiden. Trugknollen genähert, ziemlich gross, sicco länglich eiförmig, c. 3.75—4.75 cm lang, anfangs von bis c. 8.5—12 cm langen Scheiden verhüllt. Blatt gestielt, lanzettlich, an der Spitze zusammengezogen, spitz, mit einem Spitzchen, am Grunde in den Stiel verschmälert, beiderseits der unten stumpf vorragenden Mittelrippe mit c. 3 grösseren Nerven, c. 36—40 cm lang, 2—2.9 cm breit;

Stiel rinnig, c. 11—14.5 cm lang. Blütenstand mit dem jungen Blatt erscheinend, locker vielblütig; Pedunculus 20—38 cm lang; Rachis nickend, vierkantig, c. 12.5—27 cm lang, die Internodien c. 0.275—0.5 cm lang. Brakteen weit abstehend, konkav, mit eingebogenem Rande, ungefähr eirund, kurz zugespitzt, spitz, 3nervig, sicco punktiert, c. 0.4 cm lang, 0.2 cm breit. Blüten mittelgross, weit abstehend, blassgrün. Sepalen lanzettlich, spitz, 3nervig, c. 0.7—0.8 cm lang, 0.2 cm und 0.175 cm breit. Petalen schief lanzettlich, spitz, nach oben kaum ausgefressen, c. 0.63—0.7 cm lang, 0.18—0.2 cm breit. Lippe schwach gebogen, länglich, in c. $^2/_5$ über der Basis etwas eingeschnürt, blassgrünlichgelb, c. 0.43 cm lang; Hypochyl mit eingebogenem Rande, ungefähr oval oder mehr oder weniger vierkant, ausgefressen gezähnelt, mit 3 parallelen, an der Basis vereinigten Längsleisten, die mittlere schwächer, c. 0.175 cm lang, 0.15 cm breit; Epichyl ungefähr eirund, an der Spitze konvex, stumpf, c. 0.225—0.25 cm lang, 0.15 cm breit. Säule schwach gekrümmt, 0.3 cm lang; Endflügelchen konkav, länglich viereckig, abgestutzt und ungleich 4zähnig an der Spitze; Seitenflügelchen gross, vorgestreckt, mit breiter Basis inseriert, schief länglich dreieckig, zugespitzt, kaum kürzer als das Endflügelchen. Anthere herz-eiförmig, stumpf, mit höckerigem Konnektiv, 0.075 cm breit. Pollinien birnförmig. Narbe länglich viereckig, besonders am Unterrande verdickt. Ovarium 6furchig, mit dem kurzen, ziemlich dicken Stielchen c. 0.22 cm lang.

Calanthe chrysoglossoides J. J. S. in Bull. Dép. Agric. Ind. Néerl. No. XLIII (1900), 24.

Das früher beschriebene Exemplar war offenbar ein nicht sehr starkes. Herr Hauptmann J. F. K. Hansen stellte neulich freundlichtst eine Pflanze zu meiner Verfügung, der ich die folgenden Masse entnehme.

Blatt 24 cm lang, 13.5 cm breit, 9nervig; Stiel bis 12.5 cm lang. Blütenstände an den neuen Sprossen, c. 16blütig; Pedunculus 35 cm lang, sehr blassgrün; Rachis kantig, blassgrün, 6.5 cm und mehr lang. Brakteen bleibend, bis 0.3 cm lang.

***Oberonia nitidicauda** J. J. S. n. sp.

Caules approximati, elongati, penduli, compressi, dilute viri-

des, c. 11—20 cm. longi, multifolii, internodiis superne decrescentibus, c. 1—0.37 cm. longis. Folia c. 9—14 utrinque, erecto-patentia, inarticulata, lateraliter compressa, lineari-triangula vel triangula, majora plerumque leviter falcato-incurvula, acuta, basi supra vaginato-fissa et caulem amplectentia, tenuiscula, dilute viridia, superne decrescentia vel omnia parva, c. 3.2—1.1 cm. longa, basi 0.625—0.3 cm. alta. Inflorescentia brevissime pedunculata vel sessilis, subdense vel dense pluri- vel multiflora, apice laxa, c. 0.4—0.45 cm. diam., rachide costato-angulata, glabra, dilute viridi, c. 2.5—6.7 cm. longa. Bracteae adpressae, oblongae, apice angustatae, acutae, leviter irregulariter marginatae, concavae, glabrae, pallide virides, c. 0.125 cm. longae. Flores parvi, quaquaversi, subverticillati, verticillis ad c. 9floris, patentissimi, leviter ingrati, c. 0.1 vel bene 0.1 cm. lati, 0.2 cm. longi, sepalis petalisque valde revolutis, pallide vel dilute cinnamomeis. Sepalum dorsale triangulum, obtusum, c. 0.1 cm. longum, 0.06 cm. latum. Sepala lateralia late oblique triangula, obtusa, fere 0.1 cm. longa et lata. Petala linearia, obtusa, fere 0.1 cm. longa, fere 0.025 cm. lata. Labellum 3lobum, cinnamomeum, nitidum, carnosulum, incrassatione hene semiorbiculari basi excavationibus 2 instructa ad basin, 3nervium, totum c. 0.2 cm. longum, ad lobos laterales vix 0.1 cm. latius, lobis basilaribus auriculiformibus, erectis, gynostemium amplectentibus, antheram aequantibus, falcato-incurvis, suboblongo-triangulis, acutis vel acutiusculis, antice acute carinato-incrassatis, sectione transversa triquetris, latere interiore (gynostemium versus spectante) concavis, latere exteriore convexis, dorso excavatis, c. 0.075 cm. longis, lobo intermedio recto, subplano, ambitu subquadrangulo-ovali, basi leviter contracto, apice bilobulo, lobulis triangulis acutis interdum obsolete dentatis, cum apiculo reverso lateraliter compresso in sinu, c. 0.13 cm. longo, vix 0.1 cm. lato. Gynostemium breve, crassum, in utraque stigmatis parte in lobulum parvum rotundatum dilatatum, pallide viride et pallide fuscescens, c. 0.04 cm. longum, clinandrio concavo, apice triangulo, auriculis oblique triangulis. Anthera plano-cucullata, transverse ovalis, brevissime obtuse apiculata, connectivo vix incrassato, c. 0.03 cm. lata. Pollinia 4, inaequalia, flava, in corpuscula 2 obovata unita. Ovarium pallide viride, c. 0.1 cm. longum.

Java: Priangan, Tjisokan und Wasserfälle des grossen Tjidadap,

bei Tjibeber, in c. 1000 m ü.d.M. (W. F. Winckel n. 310, bl. im Mai und Juli 1917).

Die nächste Verwandte dieser Art ist wahrscheinlich *O. lucida* J. J. S. von Ambon. Sie ist vor letztgenannter Spezies ausgezeichnet durch dünnere Blätter, anders-gefärbte Blüten, die der Anthere gleich kommenden Seitenlappen der Lippe, die an der Spitze nicht oder kaum gezähnelt ist.

Sie gehört zu der gut charakterisierten Sektion *Labidous.*

Oberonia nitidicauda J. J. S.

Stengel genähert, verlängert, herabhängend, zusammengedrückt, hellgrün, c. 11—20 cm lang, vielblättrig, die Internodien c. 1—0.37 cm lang. Blätter beiderseits c. 9—14, ziemlich aufrecht, ungegliedert, seitlich zusammengedrückt, linear dreieckig bis dreieckig, die grösseren häufig schwach sichelig eingebogen, spitz, am Grunde oben scheidig gespalten und den Stengel umfassend, ziemlich dünn, hellgrün, nach oben hin kleiner werdend oder alle klein, c. 3.2—1.1 cm lang, 0.625—0.3 cm hoch. Blütenstand sehr kurz gestielt oder sitzend, ziemlich dicht oder dicht mehr- oder vielblütig, nach oben locker, c. 0.4—0.45 cm im Durchmesser; Rachis kantig rippig, kahl, hellgrün, c. 2.5—6.7 cm lang. Brakteen angedrückt, länglich, an der Spitze verschmälert, spitz, etwas unregelmässig berandet, kahl, blassgrün, c. 0.125 cm lang. Blüten klein, allseitswendig, weit abstehend, etwas unangenehm riechend, c. 0.1 oder gut 0.1 cm breit, 0.2 cm lang, die Sepalen und Petalen stark zurückgerollt, blass- oder hellbraun. Sepalen dreieckig, stumpf, die paarigen breiter, 0.1 cm lang. Petalen linear, stumpf, fast 0.1 cm lang, 0.025 cm breit. Lippe dreilappig, braun, glänzend, etwas fleischig, mit einer halbrunden, am Grunde mit 2 Aushöhlungen versehenen Verdickung an der Basis, 0.2 cm lang; Seitenlappen öhrchenförmig, aufrecht, die Säule umfassend, der Anthere gleich lang, sichelig, ungefähr länglich dreieckig, spitz oder spitzlich, vorn scharf gekielt verdickt, die innere Hälfte konkav, die äussere Hälfte konvex, hinten konkav, auf dem Querschnitt dreiseitig, c. 0.075 cm lang; Mittellappen gerade, ziemlich flach, im Umriss ungefähr viereckig oval, an der Basis etwas zusammengezogen, an der Spitze 2lappig, mit dreieckigen, spitzen, bisweilen etwas undeutlich gezähnelten Läppchen, mit einem zurückgebogenen Spitzchen im Sinus, c. 0.13 cm lang, kaum 0.1

cm breit. Säule kurz, dick, beiderseits der Narbe in ein kleines abgerundetes Läppchen verbreitert, blassgrün und blassbraun, c. 0.04 cm lang, die Öhrchen schief dreieckig. Anthere queroval, mit einem sehr kurzen, stumpfen Spitzchen. Pollinien 4, ungleich, gelb. Ovarium blassgrün, c. 0.1 cm lang.

Oberonia anceps Lndl. Sert. Orch. (1838), sub t. 8; Hook. f. Fl. Br. Ind. V, (1890), 685; J. J. S. in Fl. Buit. VI, Orch. (1905), 238; Atlas f. CLXXIV; Ames Orch. I (1905), 78; Ridl. Mat. Fl. Mal. Penins. I (1907), 18.— *O. imbricata* Wight (non Lndl.) Ic. t. 1629.— *O. Griffithii* Wight Ic. V, 4.— *O. imbricatiflora* J. J. S. in Bull. Jard. Bot. Buit. 2e sér. No. XIII (1914), 5.— *Malaxis anceps* Rchb. f. in Walp. Ann. VI (1861), 214.— *Iridorchis anceps* O. K. Rev. gen. pl. II (1891), 669.

Stengel dicht beisammen, verlängert, zusammengedrückt, geschlängelt, beblättert, c. 15—22 cm lang, die Internodien 0.8—1 cm lang. Blätter dreieckig, nicht selten etwas sichelig, stumpf oder ziemlich spitz, die mittleren am grössten, an der Rückenseite 1.2—2.1 cm lang, 0.53—0.8 cm breit. Blütenstand sehr dicht vielblütig, zylindrisch, c. 6.5—8 cm lang, 0.325 cm im Durchmesser; Rachis behaart. Brakteen über der Basis abgebrochen zurückgebogen, breit dreieckig halboval, stumpf, ausgefressen, c. 0.125 cm breit. Blüten sehr klein, dachig, braungelb, c. 0.15 cm breit. Unpaares Sepalum breit eiförmig dreieckig, die paarigen rund eiförmig, alle konvex und c. 0.1 cm lang und breit. Petalen eiförmig, spitz, konvex, fast 0.1 cm lang, 0.05 cm breit. Lippe breit, kaum 3lappig, am Grunde mit einer runden Aushöhlung zwischen den kleinen, stumpfen Öhrchen, im ganzen c. 0.125 cm lang und breit; Mittellappen durch schwache Buchten von den Öhrchen getrennt, ungefähr queroval im Umriss, kurz 2lappig an der Spitze, unregelmässig berandet, kaum etwas breiter als die Basis der Lippe. Säule sehr kurz. Anthere queroval, mit einem sehr kurzen, stumpfen Schnäbelchen. Ovarium mit wenigen Haaren, mit dem Stielchen c. 0.07 cm lang.

Java: Besoeki, bei Poeger, im Urwalde in c. 5 m ü. d. M. (S. H. Koorders n. 21448β, fr. im Oktober 1895). Kediri, bei Sripit, in 150 m ü. d. M. (C. A. Backer n. 11743, bl. im Februar 1914). Geogr. Verbr. Celebes, Singapore, Malaka, Tenasserim, Philippinen.

Nachdem ich blühendes Material von Java und anderen Gegenden untersucht habe, habe ich feststellen können, dass *O. imbricatiflora* J. J. S. mit *O. anceps* Lndl. identisch ist.

Microstylis lobatocallosa J. J. S. n. sp.

Caules approximati, erecti, c. 8 cm. longi, c. 4folii, nonnullis vaginis tubulosis acutis ad basin. Folia oblique ovata ad elliptica, acuminata, acutiuscula, basi obliqua, nervis c. 5—7 curvatis, subtus prominentibus, nervis tenuibus intermixtis, c. 3.2—11.75 cm. longa, 2—5 cm. lata, petiolo brevi, lato, canaliculato, vagina tubulosa. Inflorescentia erecta, multiflora, pedunculo alato-angulato, c. 3.5 cm. longo, rachide angulata, c. 9 cm. longa. Bracteae reflexae, lineari-triangulae, acutae, 1nerviae, ad c. 0.6 cm. longae. Flores majusculi, patentissimi, valde aperti, c. 0.8 cm. lati, bene 1 cm. longi. Sepalum dorsale deorsum spectans, rectum, oblongum, obtusum, convexum, 3nervium, c. 0.675 cm. longum, 0.225 cm. latum. Sepala lateralia oblique erecta, divergentia, oblique oblonga, obtusa, concava, margine exteriore recurva, 5nervia, c. 0.65 cm. longa, 0.37 cm. lata. Petala divergentia, linearia, apicem versus paululo dilatata, obtusa, subretusa, marginibus recurvis valde convexa, 1nervia, c. 0.6 cm. longa, 0.14 cm. lata. Labellum 3lobum, auriculatum, ambitu suborbiculare, fovea basilari subquinquangulari marginibus elevata subtus convexa, incrassatione transversa convexa postice 2loba lobis retusis quadrilobulata subtus concava anteposita, 3nervium, nervis lateralibus valde ramosis, c. 0.75 cm. latum, totum fere 0.8 cm. longum, lobis lateralibus sinu obtusangulo a lobo medio separatis, late rotundatis, convexis, lobo medio producto, integro, semiorbiculari, convexo, margine incurvulo, c. 0.2 cm. longo, 0.4 cm. lato, auriculis majusculis, oblique late triangulis, subfalcatis, obtusis, c. 0.3 cm. longis. Gynostemium a dorso compressum, apice obtusangule incurvum, ambitu oblongo-quadrangulum, c. 0.175 cm. longum, auriculis vix divergentibus, oblique quadrangulis. Anthera cucullata, transverse subsexangulata, apice retuso-truncata, c. 0.07 cm. lata. Pollinia 4, in corpuscula 2 obovato-cordata a dorso compressa unita, leviter inaequalia. Rostellum auriculis gynostemii brevius, transversum, 2dentatum. Ovarium pedicellatum obtusangule curvatum, 6angulatum, c. 0.6 cm. longum.

Java: Kediri, Goenoeng Warasegara (Wilis), in c. 1700 m ü. d. M., im Urwalde. (C. A. Backer n. 11519, bl. im Februar 1914).

Durch die Form der Lippe gehört diese Pflanze zu den Verwandten der *M. Junghuhnii* J. J. S. und *M. Koordersii* J. J. S. Vor diesen beiden Arten ist sie ausgezeichnet durch grössere Blüten und die gelappte Verdickung der Lippe.

Nach der Notiz des Sammlers sind die Blätter grün, die Blüten grünweiss, die Öhrchen der Lippe schwach purpurn.

Beschreibung nach Herbar und in Alkohol konservierten Blüten.

Microstylis lobatocallosa J. J. S.

Stengel genähert, aufrecht, c. 8 cm lang, c. 4blattrig, an der Basis mit einigen röhrigen, spitzen Scheiden. Blätter schief eirund bis elliptisch, zugespitzt, spitzlich, mit schiefer Basis, mit c. 5—7 gebogenen, unten vorragenden Nerven, c. 3.2—11.75 cm lang, 2—5 cm breit; Stiel kurz, breit, rinnig; Scheide röhrig. Blütenstand aufrecht, vielblütig; Pedunculus flügelig kantig, c. 3.5 cm lang; Rachis kantig, c. 9 cm lang. Brakteen zurückgeschlagen, linear dreieckig, spitz, 1nervig, bis c. 0.6 cm lang. Blüten ziemlich gross, weit abstehend, weit geöffnet, c. 0.8 cm breit, etwas mehr als 1 cm lang. Unpaares Sepalum gerade, länglich, stumpf, konvex, 3nervig, c. 0.67 cm lang, 0.225 cm breit. Paarige Sepalen schräg aufrecht, divergierend, schief länglich, stumpf, konkav, mit zurückgebogenem Aussenrand, 5nervig, c. 0.65 cm lang, 0.37 cm breit. Petalen divergierend, linear, gegen die Spitze kaum verbreitert, stumpf, kaum eingedrückt, durch zurückgebogene Ränder stark konvex, 1nervig, c. 0.6 cm lang, 0.14 cm breit. Lippe 3lappig, im Umriss nahezu rund, mit ungefähr fünfeckiger, an den Rändern verdickter, unten konvexer Grube, mit einer konvexen, nach hinten 2lappigen, unten konkaven Querverdickung vor der Grube, die beiden Läppchen der Verdickung eingedrükt, 3nervig, im ganzen fast 0.8 cm lang, 0.75 cm breit; Seitenlappen durch stumpfwinkelige Buchten vom Mittellappen getrennt, breit abgerundet, konvex; Mittellappen vorgezogen, ganz, halbrund, konvex, am Rande schwach eingebogen, c. 0.2 cm lang, 0.4 cm breit; Öhrchen ziemlich gross, schief breit dreieckig, etwas sichelig, stumpf,

c. 0.3 cm lang. Säule vom Rücken zusammengedrückt, an der Spitze stumpfwinkelig eingebogen, im Umriss länglich viereckig, c. 0.175 cm lang; Öhrchen kaum divergierend, schief viereckig. Anthere ungefähr quer sechseckig, an der Spitze etwas eingedrückt, c. 0.07 cm breit. Pollinien 4, zu 2 verkehrt eirund herzförmigen, vom Rücken zusammengedrückten Körperchen vereinigt. Ovarium mit dem Stielchen c. 0.6 cm lang, stumpfwinkelig gebogen, 6kantig.

Microstylis purpureonervosum J. J. S. n. sp.

Caulis erectus, c. 10 cm. longus, c. 6folius, superne nonnullis vaginis tubulosis superne accrescentibus acuminatis acutis ad c. 5.5 cm. longis donatus. Folia patentia, oblique oblongo- ad lanceolato-ovata, sensim longe acuminata, acuta, basi obliqua in petiolum contracta, nervis majoribus c. 5—6 subtus prominentibus, c. 3—10.5 cm. longa, 1.4—2.9 cm. lata; petiolus canaliculatus, cum vagina tubulosa c. 2.5—2.8 cm. longus. Inflorescentia erecta, dense multiflora, diu florens, pedunculo anguste alato-angulato, c. 3 cm. longo, rachide c. 16 cm. longa. Bracteae reflexae, lanceolato-triangulae, acutae, inferiores lanceolato-subulatae, ad c. 0.55 cm. longae. Flores parvi, patentissimi, c. 0.35 cm. lati. Sepalum dorsale deorsum spectans, ovatum, valde convexum, margine valde revolutum, obtusum, 3nervium, c. 0.23 cm. longum, 0.13 cm. latum. Sepala lateralia oblique erecta, divergentia, concava, margine valde revoluta, obtusa, 3nervia, c. 0.22 cm. longa, 0.17 cm. lata. Petala patentissima, valde revoluta, valde convexa, lineari-lanceolata, obtusa, 1nervia, fere 0.2 cm. longa, 0.06 cm. lata. Labellum late sagittatum, integerrimum, auriculis majusculis gynostemium amplectens, fovea excavata conspicua marginibus elevata gynostemium superante ad basin, 5nervium, nervis 3 intermediis simplicibus rectis parallelisque, nervis exterioribus curvatis ramosisque, explanatum ambitu rhombeum, c. 0.36 cm. latum, lamina erecta, subincurvula, marginibus valde recurva, late triangula, obtusa, c. 0.175 cm. longa, auriculis parallelis, oblique triangulis, obtusis, convexis, c. 0.175 cm. longis. Gynostemium cum ovario angulum obtusum faciens, a dorso compressum, apicem versus dilatatum, dorso convexum, c. 0.1 cm. longum, clinandrio concavo, auriculis leviter divergentibus, remotis, crassiusculis, obtusis. Anthera transversa, reniformis, apice truncata,

c. 0.05 cm. lata. Pollinia 4, in corpuscula 2 oblique obovata unita. Rostellum transversum, latum, truncatum, leviter et late retusum. Ovarium pedicellatum obtusangule curvatum, sexangulatum, c. 0.33 cm. longum. Capsula erecta.

Java: Auf dem Wilis oberhalb Kediri in 900 m ü. d. M., im sekundären Walde. (C. A. Backer n. 11467, bl. im Februar 1914).

Die Art ist verwandt mit *M. tjiwideiensis* J. J. S., von der sie sich unterscheidet durch schmälere, länger zugespitzte Blätter, kürzeren Pedunculus und viel kleinere Blüten.

Nach Backer sind die Blätter grün mit purpurnen Hauptadern, die Blüten purpurn.

Beschreibung nach einem getrockneten Exemplar und einigen in Alkohol konservierten Blüten.

Microstylis purpureonervosum J. J. S.

Stengel aufrecht, c. 10 cm lang, c. 6blättrig, nach unten mit einigen röhrigen, nach oben hin grösser werdenden, zugespitzten, spitzen, bis c. 5.5 cm langen Scheiden. Blätter abstehend, schief länglich bis lanzettlich eirund, allmählich lang zugespitzt, spitz, mit schiefer, in den Blattstiel zusammengezogener Basis, mit c. 5—6 unten vorragenden grösseren Nerven, c. 3—10.5 cm lang, 1.4—2.9 cm breit; Stiel rinnig, mit der röhrenförmigen Scheide c. 2.5—2.8 cm lang. Blütenstand aufrecht, dicht vielblütig, lange fortblühend; Pedunculus schmal flügelig kantig, c. 3 cm lang; Rachis c. 16 cm lang. Brakteen zurückgeschlagen, lanzettlich dreieckig, spitz, die unteren lanzettlich pfriemlich, bis c. 0.55 cm lang. Blüten klein, weit abstehend, c. 0.35 cm breit. Unpaares Sepalum abwärts gewandt, eirund, stark konvex mit zurückgebogenem Rande, stumpf, 3nervig, c. 0.23 cm lang, 0.13 cm breit. Paarige Sepalen schräg aufrecht, divergierend, konkav mit stark zurückgebogenen Rändern und Spitze, schief eirund, stumpf, 3nervig, c. 0.22 cm lang, 0.17 cm breit. Petalen weit abstehend, stark zurückgerollt, sehr konvex, linear lanzettlich, stumpf, 1nervig, nahezu 0.2 cm lang, 0.06 cm breit. Lippe breit pfeilförmig, ungeteilt, mit ziemlich grossen Öhrchen die Säule umfassend, am Grunde mit einer starken, von erhabenen Rändern umgebenen, die Säule überragenden Aushöhlung, 5nervig, die 3 mittleren

Nerven gerade, parallel, einfach, die beiden äusseren gekrümmt und verzweigt, ausgespreizt im Umriss rautenförmig, c. 0.36 cm lang, 0.26 cm breit, die Platte aufrecht, etwas eingebogen, mit stark zurückgebogenem Rande, breit dreieckig, stumpf, c. 0.175 cm lang, die Öhrchen parallel, schief dreieckig, stumpf, konvex, c. 0.175 cm lang. Säule mit dem Fruchtknoten einen stumpfen Winkel bildend, vom Rücken zusammengedrückt, gegen die Spitze verbreitert, mit konvexem Rücken, c. 0.1 cm lang; Clinandrium konkav; Öhrchen etwas divergierend, weit auseinander stehend, ziemlich dick, stumpf. Anthere quer, nierenförmig, mit abgestutzter Spitze, c. 0.05 cm breit. Pollinien 4, zu 2 schief verkehrt eiförmigen Körperchen vereinigt. Rostellum quer, breit abgestutzt, schwach und breit eingedrückt. Ovarium mit dem Stielchen stumpfwinkelig gebogen, 6kantig, c. 0.33 cm lang. Frucht aufrecht.

* **Microstylis cuprea** J. J. S. n. sp.

Caulis sectione transversa ovalis, atropurpureus, c. 7—12 cm. longus, ad nodos ad 0.5 cm. diam., c. 8—10folius, internodiis c. 1—1.2 cm. longis. Folia oblique ovato-elliptica ad oblonga, acuta, basi valde obliqua, crispula, nervis 3 supra impressis subtus carinatis, supra nitidule obscure cuprea, subtus dilute cinereo-viridia, c. 2.2—5 cm. longa, 1.5—2.4 cm. lata; vaginae breviter tubulosae, antice rumpentes, internodiis breviores, cum petiolo canaliculato c. 1.3—1.5 cm. longae, 3costatae, atropurpureae. Inflorescentia multiflora, diu florens, pedunculo alato-angulato, dilute purpureo, c. 5.5—6 cm. longo, vaginula patentissima bracteiformi donato, rachide alato-costata, pallide viridi, in alis dilute purpurea, 5 cm. superante. Bracteae reflexae, lanceolato-triangulae, acutae, concavae, pallide virides, purpureo-marginatae, ad c. 0.45 cm. longae. Flores c. 0.4 cm. lati, 0.525 cm. longi. Sepalum dorsale ovatum, obtusum, convexum, apice revolutum, ochrascens, purpureo-suffusum, c. 0.275 cm. longum, 0.15 cm. latum. Sepala lateralia oblique patentia, oblique ovata, obtusa, convexa, superne concavo-impressa, 3nervia, ochrascentia, dimidiis proximis purpureo-suffusa, c. 0.24 cm. longa, 0.18 cm. lata. Petala recurva, oblique linearia, obtusa, convexa, 1nervia, ochrascentia, apice vix purpureo-suffusa, c. 0.25 cm. longa, 0.06 cm. lata. Labellum hippocrepidiforme, fovea longitudinali ovali marginibus convexo-incrassata usque in basin lobi intermedii, ima basi lamella transversa 3lobulata basi gynoste-

mii adpressa instructum, 5nervium, ochrascens, basi macula purpurea notatum, explanatum totum c. 0.55 cm., usque ad basin 0.35 cm. longum, 0.44 cm. latum, lobo intermedio majusculo, apice incurvo, bifido, cum laciniis oblique oblongo-triangulis obtusis, c. 0.17 cm. longo, 0.18 cm. lato, laciniis c. 3 elongatis subulatis apice incurvis exterius valde decrescentibus usque ad 0.17 cm. longis utrinque, auriculis remotis, oblique triangulis, obtusis, basi introrsum dilatatis, c. 0.2 cm. longis. Gynostemium inclinatum, a dorso compressum, aureum, basi pallide flavum, c. 0.14 cm. longum, auriculis oblongis, obtusis. Anthera cucullata, abbreviato-ovato-triangula, obtusa, vel retusa connectivo incrassato aureo, albo-marginata, c. 0.05 cm. lata. Polinia 4, a dorso compressa, oblongo-obovata, pallide flava, c. 0.04 cm. longa. Ovarium pedicellatum curvatum, dilute viride, costis purpureis, c. 0.3 cm. longum.

Java: Priangan, Tjisokan und Goenoeng Beser bei Tjibeber, in c. 1000 m ü. d. M. (W. F. Winckel n. 162, bl. im Oktober 1916).

Die Art ist von der nächstverwandten *M. amplectens* J. J. S. verschieden durch viel kleinere, anders gefärbte Blätter, anders gefärbte Blüten, ein eiförmiges unpaares Sepalum. Die Arten dieser Gruppe sind besonders getrocknet sehr schwierig auseinander zu halten.

Microstylis cuprea J. J. S.

Stengel auf dem Querschnitt oval, dunkelpurpurn, c. 7—12 cm lang, bis 0.5 cm breit, c. 8—10blättrig, die Internodien c. 1—1.2 cm lang. Blätter schief eirund elliptisch bis länglich, spitz, mit sehr schiefer Basis, kraus, mit 3 oben gefurchten, unten gekielten Nerven, oben schwach glänzend dünkelkupferbraun, unten hellgraugrün, c. 2.2—5 cm lang, 1.5—2.4 cm breit; Scheiden kurz röhrig, vorn aufreissend, kürzer als die Internodien, mit dem rinnigen Blattstiel c. 1.3—1.5 cm lang, 3rippig, dunkelpurpurn. Blütenstand vielblütig, lange fortblühend; Pedunculus flügelig kantig, hellpurpurn, c. 5.5—6 cm lang, mit einem weit abstehenden, brakteeförmigen Schaftblatt; Rachis flügelig kantig, blassgrün, auf den Flügelchen hellpurpurn, mehr als 5 cm lang. Brakteen zu-

rückgeschlagen, lanzettlich dreieckig, spitz, konkav, blassgrün, purpurn berandet, bis c. 0.45 cm lang. Blüten c. 0.4 cm breit, 0.525 cm lang. Unpaares Sepalum eirund, stumpf, konvex, an der Spitze zurückgerollt, ockergelblich, purpurn angelaufen, c. 0 275 cm lang, 0.15 cm breit. Paarige Sepalen abstehend, schief eirund, stumpf, konvex, nach oben mit einer Vertiefung, 3nervig, ockergelblich, die einander zugewandten Hälften purpurn überlaufen, c. 0.24 cm lang, 0.18 cm breit. Petalen zurückgebogen, schief linear, stumpf, konvex, 1nervig, ockergelblich, an der Spitze kaum purpurn angelaufen, c. 0.25 cm lang, 0.06 cm breit. Lippe hufeisenförmig, mit einer ovalen, an den Rändern konvex verdickten, bis an die Basis des Mittellappens reichenden Längsgrube, an der Basis mit einer dreilappigen, der Säule angedrückten Querlamelle, 5nervig, ockergelblich, an der Basis mit einem purpurnen Flecken, ausgespreizt im ganzen c. 0.55 cm, bis zur Basis 0.35 cm lang, 0.44 cm breit; Mittellappen ziemlich gross, dreieckig, an der Spitze eingebogen, 2spaltig, mit schief länglich dreieckigen, stumpfen Läppchen, 0.17 cm lang, 0.18 cm breit, beiderseits mit c. 3 verlängerten, pfriemlichen, an der Spitze eingebogenen, nach aussen abnehmenden, bis c. 0.17 cm langen Lazinien; Öhrchen entfernt, schief dreieckig, stumpf, an der Basis nach innen verbreitert, c. 0.2 cm lang. Säule vom Rücken zusammengedrückt, goldgelb, am Grunde blassgelb, c. 0.14 cm lang; Öhrchen länglich, stumpf. Anthere verkürzt eirund dreieckig, stumpf oder schwach eingedrückt, mit verdicktem, goldgelbem Konnektiv, weiss berandet, c. 0.05 cm breit. Pollinien 4, vom Rücken zusammengedrückt, schief länglich verkehrt eirund, blassgelb, c. 0.04 cm lang. Ovarium mit dem Stielchen c. 0.3 cm lang, gekrümmt, 6rippig, hellgrün, mit purpurnen Rippen.

*Microstylis longidens J. J. S. n. sp.

Caulis erectus, leviter serpentinus, sectione transversa ellipticus, carnosus, dilute viridis, c. 13 cm. longus, 0.83 cm. latus, c. 8folius, internodiis ad c. 2 cm. longis, infimis et ultimis brevioribus. Folia oblique oblongo- ad lanceolato-elliptica, triangulo-acuminata, acuta, basi acuta valde obliqua, nervis 5 supra sulcatis subtus carinatis, dilutius viridia, c. 5—14 cm. longa, 1.9—4.7 cm. lata; petiolus canaliculatus, marginibus incurvis trigono-tubulosus, cum vagina brevi tubulosa c. 3.5—5 cm. longus. Inflore

scentia erecta, densius multiflora, cylindrica, pedunculo costulato, dilute viridi, violaceo-suffuso, c. 6 cm. longo, vaginulis c. 3 bracteiformibus instructo, rachide stricta, angustissime alato-costulata, violaceo-suffusa, c. 21.5 cm. longa. Bracteae reflexae, subulatae, concavae, purpureae, ad c. 0.75 cm. longae. Flores patentissimi, majusculi, atroviolaceo-purpurei, c. 1 cm. longi, 0.575 cm. lati. Sepalum dorsale deorsum spectans, oblongum, obtusiusculum, convexum, apice pallidum, c. 0.46 cm. longum, 0.2 cm. latum. Sepala lateralia patentia, plus minusve recurva, oblique ovata, vix falcatula, obtusa, convexa, superne concava, c. 0.375 cm. longa, 0.23 cm. lata. Petala reflexa, oblique subspathulato-linearia, obtusa, plus minusve retusa, convexa cum sulco longitudinali, c. 0.475 cm. longa, bene 0.1 cm. lata. Labellum hippocrepidiforme, 3lobum, fovea magna quinquangulari margine valde elevato cincta basin lobi intermedii attingente, basi lamella transversa 2dentata pallida gynostemio adpressa donatum, totum c. 0.9 cm. longum, bene 0.5 cm. latum, lobo intermedio producto, ambitu ovato, convexo, alte bipartito cum denticulo minimo recurvo in sinu, utrinque in lacinias 2—3 longe subulatas falcatas soluto, c. 0.23 cm. longo, lobis lateralibus leviter rotundatis ad basin lobi intermedii, dente brevi triangulo instructis, auriculis parallelis, elongatis, anguste triangulis, anguste obtusis, convexis, c. 0.43 cm. longis. Gynostemium valde obtusangule curvatum, a dorso compressum, apicem versus dilatatum, superne dilute viride, basi pallidum et leviter purpureo-suffusum, clinandrio transverso, concavo, auriculis truncatis. Anthera cucullata, semiorbiculari-ovata, obtusissima, basi papilloso-bilobulata, alba, connectivo pallide flavo, c. 0.07 cm. lata. Pollinia 4, geminata, valde a dorso compressa, clavato-pyriformia, falcata, obtusa, basi acuta, flava, c. 0.06 cm. longa. Rostellum late excisum. Ovarium pedicellatum obtusangule curvatum, 6costatum, atropurpureum, c. 0.8—1 cm. longum.

Java: Priangan, Singaparna. (C. A. Backer, leb. Pfl. kult. in Hort. Bog. unter n. 12).

Die Art ist sehr nahe verwandt mit *M. perakensis* Ridl. Nach der Beschreibung hat diese Art jedoch einen kriechenden Stengel, eirunde Blätter, einen vierkantigen Blütenschaft, etwas kleinere, anders gefärbte, länger gestielte, auseinander gestellte Blüten.

Herr Ridley war seiner Zeit so freundlich mir einige Blüten der *M. perakensis* zuzuschicken, die leider in nicht sehr gutem Zustande, verkehrten und beschädigt waren. Ich konnte aber feststellen, dass die Lippen der beiden Pflanzen einander sehr ähnlich sind. Ich wage es jedoch nicht ohne gutes Material gesehen zu haben, die Pflanzen für identisch zu erklären.

Beschreibung nach einer in Buitenzorg kultivierten Pflanze.

Microstylis longidens J. J. S.

Stengel aufrecht, etwas geschlängelt, auf dem Querschnitt elliptisch, fleischig, hellgrün, c. 13 cm lang, 0.83 cm breit, c. 8blättrig, die Internodien bis c. 2 cm lang, die unteren und höchsten kürzer. Blätter schief länglich bis lanzettlich elliptisch, dreieckig zugespitzt, spitz, mit spitzer, sehr schiefer Basis, mit 5 oben gefurchten, unten gekielten Nerven, ziemlich hellgrün, c. 5—14 cm lang, 1.9—4.7 cm breit; Stiel rinnig, durch eingebogene Ränder dreikantig röhrig, mit der kurzen, röhrigen Scheide c. 3.5—5 cm lang. Blütenstand aufrecht, ziemlich dicht vielblütig; Pedunculus vielrippig, hellgrün, violett angestrichen, c. 6 cm lang, mit c. 3 brakteeförmigen Schaftblättern; Rachis gerade, sehr schmal flügelig vielrippig, violett angestrichen, c. 21.5 cm lang. Brakteen zurückgeschlagen, pfriemlich, konkav, purpurn, bis c. 0.75 cm lang. Blüten weit abstehend, ziemlich gross, dunkelviolettpurpurn, c. 1 cm lang, 0.575 cm breit. Unpaares Sepalum abwärts gewandt, länglich, stumpflich, konvex, mit blasser Spitze, c. 0.46 cm lang, 0.2 cm breit. Paarige Sepalen abstehend, mehr oder weniger zurückgebogen, schief eirund, kaum etwas sichelig, stumpf, konvex, nach oben konkav, c. 0.375 cm lang, 0.23 cm breit. Petalen zurückgebogen, schief, etwas spatelig linear, stumpf, mehr oder weniger eingedrückt, konvex mit einer Längsfurche, c. 0.475 cm lang, gut 0.1 cm breit. Lippe hufeisenförmig, 3lappig, mit einem grossen, fünfeckigen, von einem stark erhabenen Rande umgebenen, bis zur Basis des Mittellappens reichenden Nektarium, an der Basis mit einer der Säule angedrückten, 2zähnigen, blassen Querlamelle, im ganzen c. 0.9 cm lang, gut 0.5 cm breit; Mittellappen im Umriss eirund, konvex, tief 2teilig, mit einem sehr kleinen, zurückgebogenen Zähnchen im Sinus, die beiden Hälften tief in 2—3 lang pfriemliche, sichelige Lazinien geteilt, c. 0.23 cm lang; Seitenlappen seicht abgerundet, mit einem kurzen, dreieckigen

Zahn am Grunde des Mittellappens; Öhrchen parallel, lang, schmal dreieckig, schmal stumpf, konvex, c. 0.43 cm lang. Säule stark stumpfwinkelig gebogen, vom Rücken zusammengedrückt, gegen die Spitze verbreitert und hellgrün, an der Basis blass und etwas purpurn angestrichen; Clinandrium quer, konkav; Öhrchen abgestutzt. Anthere kappig, schwach konvex, halbkreisförmig eirund, sehr stumpf, an der Basis mit 2 papillösen Läppchen, weiss, mit blassgelbem Konnektiv, c. 0.07 cm breit. Pollinien 4, stark vom Rücken zusammengedrückt, keulig birnformig, sichelig stumpf, mit spitzer Basis, gelb, c. 0.06 cm lang. Rostellum breit ausgeschnitten. Ovarium mit dem Stielchen c. 0.8—1 cm lang, stumpfwinkelig gebogen, 6rippig, dunkelpurpurn.

***Microstylis foetida** J. J. S. n. sp.

Caules approximati, erecti, sectione transversa elliptici, carnosi, dilute virides, ad c. 7.5 cm. longi, 1.2 cm. lati, c. 5—6folii, basi nonnullis vaginis donati. Folia patentia, oblique oblongo-elliptica ad lanceolata, acuminata, acuta, basi obliqua in petiolum contracta, leviter undulata, nervis 5 supra sulcatis subtus carinatis, supra inter nervos convexa, dilute viridia, c. 8—16 cm. longa, 2.4—5.5 cm. lata; petiolus canaliculatus, 3costatus, cum vagina tubulosa c. 1.5—5.5 cm. longus, pallide viridis. Inflorescentia terminalis, erecta, subsessilis, densius multiflora, cylindrica, 22 cm. longa, 1.8 cm. diam., rachide tereti, costulata, pallide viridi et purpurea. Bracteae reflexae, lanceolato triangulae, acutae, pallide virides, late purpureo-marginatae, ad c. 0.9 cm. longae. Flores patentissimi, mediocres, sordide purpurei, foetidi, c. 0.9 cm. longi, 0.97 cm. lati. Sepalum dorsale deorsum spectans, marginibus revolutis obtegentibus tubulosum, oblongum, obtusum, 3nervium, c. 0.5 cm. longum, bene 0.2 cm. latum. Sepala lateralia erecto-patentia, divergentia, marginibus valde recurvis convexa, apice antice excavatione orbiculari concava, inexplanata spathulata, explanata oblique ovalia, subfalcata, obtusa, 3nervia, c. 0.4 cm. longa, 0.24 cm. lata. Petala patentissima, incurvula, marginibus valde recurvis convexa, subspathulato-lanceolata, falcatula, obtusa, 1nervia, c. 0.47 cm. longa, 0.13 cm. lata. Labellum hippocrepidiforme, superne utrinque plica 1 antica et 1 postica instructum, apice convexo-incurvum, antice 10dentatum, dentibus 2 intermediis (lobo intermedio) quam sequentes brevioribus oblique triangulis anguste obtusis, 6 sequentibus anguste triangulis falcatulis, 2 extremis brevibus obtusis, purpureum, basi lamella transversa bilobula gynostemio adpressum, fovea majuscula, late oblonga, margine valde elevata antice recurvula, pallide flavescenti et viscida, auriculis oblique oblongo-triangulis, obtusis, totum c. 0.575 cm., absque auriculis 0.3 cm. longum, 0.5 cm. latum, auriculis 0.275 cm. longis. Gynostemium obtusangule curvatum, a dorso compressum, oblongo-quadrangulum, dilute viride, basi purpureum, macula purpurea in utraque clinandrii parte, c. 0.2 cm. longum auriculis verticalibus, leviter divergentibus, latis, angulato-rotundatis, margine superiore dente obtuso instructis. Anthera transverse ovalis, basi bilobulata papillosaque, c. 0.075 cm. lata, alba, connectivo incrassato, dilute citrino. Pollinia 4, inaequalia, valde a dorso compressa, falcata, obtusa, basi acuta, flava, c. 0.04 cm. longa. Rostellum late excisum. Ovarium pedicellatum obtusangule curvatum, valde 6costatum, costis atropurpureum, sulcis pallide flavo-viride, c. 0.6 cm. longum.

Java? (Kult. in Hort. Bog.)

Es ist nicht sicher, aber sehr wahrscheinlich, dass diese Pflanze aus West-Java stammt.

Sie ist nahe verwandt mit *M. longidens* J. J. S. und sieht dieser Art sehr ähnlich. Von dieser ist sie zu unterscheiden durch den nahezu sitzenden Blütenstand, mit den Rändern stark zurückgebogene Sepalen und Petalen, weit abstehende Petalen, und die Form der Lippe, die an der Spitze nicht vorgezogen ist und viel kürzere Öhrchen besitzt.

Die Blüten haben eienen sehr unangenehmen Geruch.

Microstylis foetida J. J. S.

Stengel dicht beisammen, aufrecht, auf dem Querschnitt elliptisch, fleischig, hellgrün, bis c. 7.5 cm lang, 1.2 cm breit, c. 5—6blättrig, am Grunde mit einigen Scheiden. Blätter abstehend, schief langlich elliptisch bis lanzettlich, zugespitzt, spitz, mit schiefer Basis, am Grunde in den Blattstiel zusammengezogen, schwach wellig, mit 5 oben gefurchten, unten gekielten Nerven, oben zischen den Nerven konvex, hellgrün, c. 8—16 cm lang, 2.4—5.5 cm breit; Blattstiel rinnig, 3rippig, mit der röhrigen Scheide c. 1.5—5.5

cm lang, blassgrün. Blütenstand aufrecht, nahezu sitzend, ziemlich dicht vielblütig, zylindrisch, c. 22 cm lang, 1.8 cm im Durchmesser; Rachis stielrund, rippig, blassgrün und purpurn gefärbt. Brakteen zurückgeschlagen, lanzettlich dreieckig, spitz, blassgrün, breit purpurn berandet, bis c. 0.9 cm lang. Blüten weit abstehend, mittelgross, schmutzig purpurn, stinkend, c. 0.9 cm lang, 0.97 cm breit. Unpaares Sepalum abwärts gewandt, durch zurückgerollten, einander überdeckenden Rändern röhrig, länglich, stumpf, 3nervig, c. 0.5 cm lang, gut 0.2 cm breit. Paarige Sepalen aufrecht abstehend, auseinanderfahrend, konvex mit stark zurückgebogenen Rändern, an der Spitze innen mit einer runden Vertiefung, unausgespreizt spatelig, ausgespreizt schief oval, etwas sichelig, stumpf, 3nervig, c. 0.4 cm lang, 0.24 cm. breit. Petalen weit abstehend, etwas eingebogen, durch stark zurückgebogene Ränder konvex, spatelig lanzettlich, schwach sichelig, stumpf, 1nervig, c. 0.47 cm lang, 0.13 cm breit. Lippe hufeisenförmig, nach oben beiderseits mit einer nach innen und einer nach aussen vorspringenden Falte, die Spitze konvex einwärts gebogen, am vorderen Rande 10zähnig, die 2 mittleren Zähne (Mittellappen) kürzer als die übrigen, schief dreieckig und schmal stumpf, die 6 folgenden schmal dreieckig und schwach sichelig, die 2 äusseren kurz dreieckig und stumpf, im ganzen purpurn, am Grunde mit einer kleinen, 2lappigen, der Säule angedrückten Querlamelle und mit grosser, breit länglicher, von einem stark erhabenen, vorn etwas zurückgebogenen, blassgelblichen und klebrigen Rande umgebenen Honiggrube, die Öhrchen schief länglich dreieckig und stumpf, im ganzen c. 0.575 cm, ohne die 0.275 cm langen Öhrchen 0.3 cm lang, 0.5 cm breit. Säule stumpfwinkelig gebogen, vom Rücken zusammengedrückt, länglich viereckig, hellgrün, an der Basis purpurn, beiderseits des Clinandrium mit einem purpurnen Fleck, c. 0.2 cm lang; Öhrchen vertikal, etwas divergierend, breit, eckig abgerundet, am oberen Rande mit einem stumpfen Zahn. Anthere quer oval, an der Basis kurz 2lappig und papillös, c. 0.075 cm breit, weiss, mit verdicktem, hellzitronengelbem Konnektiv. Pollinien 4, ungleich, stark vom Rücken zusammengedrückt, sichelig, stumpf, mit spitzer Basis, gelb, c. 0.04 cm lang. Rostellum breit ausgeschnitten. Ovarium mit dem Stielchen stumpfwinkelig gebogen, stark 6rippig, die Rippen purpurn, die Rinnen blassgelbgrün, c. 0.6 cm lang.

Liparis angustiflora J. J. S. n. sp.

Planta parva, caespitosa. Pseudobulbi approximati, compressi, ovati, sectiona transversa anguste elliptici, dilute virides, c. 1.2—1.5 cm. longi, 0.9—0.65 cm. lati, superne 1—2 folii, nonnullis vaginis imbricatis superne accrescentibus et 1—2 superioribus laminam gerentibus ad basin. Folia lineari-lanceolata, acuta, apiculata, basin versus sensim angustata et basi conduplicata, costa media supra sulcata subtus manifeste acute carinata, opaca, dilute viridia, c. 4—7.5 cm. longa, 0.63—0.9 cm. lata; vaginae e basi lata pseudobulbo adnata marginibus decurrente angustatae, conduplicatae, carinatae, erectae vel erecto-patentes, c. 0.8—1.2 cm. longae. Inflorescentia folia superans, laxa, satis multiflora, pedunculo tenui, c. 5.8 cm. longo, nonnullis vaginulis bracteiformibus adpressis donato, rachide alato-triquetra, c. 5—8 cm. longa, internodiis c. 0.5—0.75 cm. longis. Bracteae patentissimae, ovatae, acutae, subplanae, ad c. 0.35 cm. longae. Flores c. 13, petalis reflexis angusti, c. 0.8 cm. longi. Sepalum dorsale oblique erectum, $^2/_5$ partibus superioribus rectangule incurvum, oblongo-ovato-triangulum, apicem versus sensim angustatum, obtusum, convexum, marginibus valde revolutis dorso superne contiguis, carinatum, c. 0.63 cm. longum, 0.26 cm. latum. Sepala lateralia deflexa, parallela, apice incurva, suboblique ovato-lanceolata, apicem versus sensim angustata, obtusa, lateribus in utraque costae parte valde convexa, marginibus valde revolutis superne duplicato tubulosa, dorso carinata, papillosa, 1nervia, c. 0.675 cm. longa, 0.2 cm. lata. Petala reflexa, ovario parallela, apice recurva, anguste linearia, apicem versus angustata, convexa, 1nervia. c. 0.5 cm. longa, 0.03 cm. lata. Labellum deorsum spectans et paulo reversum, cum ovario angulum acutum faciens, dorso supra basin insertum, ambitu oblongo-subtriangulum, postice carnoso-subtrilobo-truncatum et gynostemio adpressum, lobulis basilaribus lateralibus angulato-rotundatis recurvulis incrassatis, callo conspicuo orbiculari convexo perforato medio supra basin, apice longius et acute acuminatum et obtusangule recurvum, convexum, costis 2 intramarginalibus margini parallelis curvatis superne altioribus et bene infra apicem utrinque in corniculum subulatum falcato-incurvum quam apicem paulo brevius exeuntibus, dorso concavum, 5nervium, c. 0.4 cm. longum, basi 0.2 cm. latum. Gynostemium ovarium continuum, latum, ovario multo latius, a dorso compressum, dorso convexum, basi trunca-

tum, utrinque carnoso-alato-dilatatum, alis supra basin utrinque leviter rotundato-dilatatis, infra apicem dente patentissimo leviter reverso oblique triangulo-subulato acuto instructis, ala conspicua longitudinali porrecta oblique rotundato-triangula carnosa abrupte terminante subtus in gynostemii dimidio superiore in utraque stigmatis parte, apice subtruncatum, c. 0.16 cm. longum, 0.17 cm. latum, clinandrio concavo, auriculis brevissimis, rotundatis. Anthera cucullata, transverse subovalis, apice vix producta, obtusissima, c. 0.07 cm. lata. Stigma semiorbiculare. Ovarium breve, c. 0.1 cm. longum; pedicellus tenuis, c. 0.7 cm. longus.

Java: Priangan, Kawah Kamodjan, in c. 1600 m ü. d. M., epiphytisch im Urwalde. (W. Docters van Leeuwen n. 2438, bl. im September 1916).

Diese Art scheint *L. aurita* Ridl. von Timor am nächsten zu stehen. Sie unterscheidet sich der Beschreibung der Ridleyschen Art nach jedoch u. m. durch die nicht keilige, aber gerade an der Basis breite, an der Spitze nicht in 3 stumpfe Läppchen geteilte, sondern sehr spitz zugespitzte und mit 2 spitzen Hörnchen versehene Lippe. Auch die übrigen Teile zeigen deutliche Unterschiede.

Durch die mit den Rändern stark zurückgerollten Sepalen und die zurückgeschlagenen Petalen erscheinen die Blüten sehr schmal.

Nach Herrn Dr. W. Docters van Leeuwen sind die Blüten orange.

Beschreibung nach einer lebenden, nicht blühenden Pflanze und einem in Alkohol konservierten Blütenstand.

Liparis angustiflora J. J. S.

Kleine Pflanze. Trugknollen dicht beisammen, zusammengedrückt, eirund, hellgrün, c. 1.2—1.5 cm lang, 0.9—0.65 cm breit, nach oben 1—2blättrig, am Grunde mit einigen Scheiden, von welchen die höchsten eine Spreite tragen. Blätter linear lanzettlich, spitz, mit einem Spitzchen, gegen die Basis allmählich verschmälert, unten gekielt, matt hellgrün, c. 4—7.5 cm lang, 0.7—0.9 cm breit; Scheiden aus breiter, dem Trugknollen angewachsener Basis verschmälert und zusammengelegt. Blütenstand länger als der Trugknollen, locker, ziemlich vielblütig; Pedunculus c. 5.8 cm lang, mit einigen anliegenden Schaftblättern; Rachis schwach flügelig dreikantig, c. 5—8 cm lang. Brakteen eirund, spitz, bis c. 0.35 cm lang. Blüten c. 13, c. 0.8 cm lang. Unpaares Sepalum schräg aufrecht, mit eingebogener Spitze, länglich eirund dreieckig, stumpf, mit stark zurückgerollten Rändern, aussen gekielt, c. 0.63 cm lang, 0.16 cm breit. Paarige Sepalen abwärts gewandt, mit eingebogener Spitze, eirund lanzettlich, stumpf, mit stark zurückgerollten Rändern, aussen gekielt, papillös, c. 0.67 cm lang, 0.2 cm breit. Petalen zurückgeschlagen, schmal linear, konvex, c. 0.5 cm lang, 0.03 cm breit. Lippe abwärts gewandt, im Umriss länglich dreieckig, an der Basis dick, abgestutzt und sehr schwach 3lappig, mit abgerundeten Seitenläppchen, in der Mitte am Grunde mit einer runden, konvexen, in der Mitte durchlöcherten Verdickung, an der Spitze spitz zugespitzt und etwas zurückgebogen, konvex, mit 2 dem Rande parallelen Leisten, die unterhalb der Spitze je in ein freies, eingebogenes, spitzes, der Lippenspitze nahezu gleich langes Hörnchen ausgehen, c. 0.4 cm lang, 0.2 cm breit. Säule vom Rücken zusammengedrückt, sehr breit, an der Basis abgestutzt, breit und fleischig geflügelt, mit überhalb der Basis etwas verbreiterten und abgerundeten, unterhalb der Spitze in einen absthenden, schmal dreieckigen, spitzen Zahn ausgehenden Flügelchen, die obere Hälfte unten mit 2 abstehenden, schief abgerundeten, dreieckigen Flügelchen, c. 0.16 cm lang, 0.17 cm breit. Anthere quer oval. Narbe halbrund. Ovarium mit dem Stielchen 0.8 cm lang.

* **Agrostophyllum tenue** J. J. S. n. sp.

Rhizoma breve, valde ramosum, radicibus crassis. Caules approximati, numerosi, erecti, patentes vel arcuati, simplices, tenues, sectione transversa elliptici, nitidi, dilute virides, ad c. 85 cm. longi, bene 0.2—0.3 cm., sub capitulo ad 0.4—0.45 cm. lati, multifolii, basi vaginis imbricantibus tubulosis nigro-marginatis superne accrescentibus donati, internodiis c. 3—3.5 cm. longis. Folia erecto-patentia, linearia, apicem versus sensim angustata, breviter subinaequaliter acute bidentata, mucrone longiore interposito, basi semitorta, costa media supra sulcata subtus prominente, papyracea, supra nitide viridia, subtus nitidula, c. 14—21 cm. longa, 0.6—0.8 cm. lata, inferiora decrescentia; vaginae tubulosae,

sectione transversa ellipticae, apice initio truncatae et integrae, mox plus minusve exciso-rumpentes et sicco-membranacee atromarginatae, nitidae, pallide virides, internodium superantes, 0.3—0.325 cm. latae. Inflorescentiae capituliformes, terminales, nutantes, semiglobosae, dense multiflorae, ad c. 2.7 cm. diam., vaginulis magnis rumpentibus mox exarescentibus c. 1—1.1 cm. longis suffultae. Inflorescentiae partiales c. 4florae, totae c. 1.3 cm. longae, pedunculo brevi, pluribus vaginulis superne accrescentibus imbricantibus basi tubulosis obtusis multinervis membranaceis tecto. Bracteae adpressae, concavae, superne cucullatae, explanatae suborbiculari-obovatae, obtusae, retusae, c. 0.7—0.73 cm. longae. Flores albi, c. 0.7 cm. lati. Sepalum dorsale erectum, subovatum, obtusum, dorso ad apicem minute conico-apiculatum, basi convexum, ceterum concavum, medio subcucullatum, c. 0.42 cm. longum, 0.24 cm. latum. Sepala lateralia basi marginibus proximis tegentia et conglutinata, saccum labelli includentia, mentum brevissimum latum ovario latius truncatum formantia, concava, late oblique ovato-triangula, acutiuscula, 5nervia, c. 0.42 cm. longa, 0.3 cm. lata. Petala patentissima, apice recurva, e basi subovali sublineari-acuminata, obtusa, convexa, c. 0.375 cm. longa, 0.1 cm. lata. Labellum gynostemio paulo brevius, marginibus erectis leviter rotundatis gynostemio utroque latere adpressum, subtus medio alte et angustissime constrictum, constrictione intus in lamellam transversam margines labelli fere attingentem producta, totum c. 0.35 cm. longum, hypochylio saccato, obtuso, a latere viso triangulo, epichylio cucullato, breviter trilobo, eroso, c. 0.175 cm. longo, lobis lateralibus obtusis, lobo medio vix longiore, late triangulo, obtuso. Gynostemium subsigmoideum, dorso sensim subtus in $^2/_5$ partibus supra basin angulato-curvatum, subtus concavum, marginibus supra medium obtusangulis, c. 0.36 cm. longum, clinandrio concavo, ovato, margine utrinque subrectangule exciso, apice lato truncato. Anthera cucullata, ovata, obtuse acuminata, pallide brunnescens, c. 0.1 cm. lata, connectivo orbiculari-gibboso. Pollinia 8, angusta, lineari clavata, obtusa, extus convexa, intus plana, pallide flava, cum glandula suborbiculari brunnea bene 0.2 cm. longa. Rostellum acute bidentatum. Stigma minimum, apici gynostemii approximatum, margine inferiore in lamellam transversam rectangule patentissimam quadrangulam truncatam rostellum aequantem productum. Ovarium etortum, 6sulcatum, album, c. 0. 6 cm. longum.

Java: Priangan, Tjibodas auf dem Gede, in 1425 m ü.d.M. an einem Baumfarn im Garten. (H. Hallier n. 229, im Januar 1895, steriel). Im Urwalde Pasir Kaboejoetan bei Lemboer Tjimaloha. (Mangoenkromodiredjo, im Januar 1897, steriel, Kds n. 26547 β). Tjadas Malang bei Tjibeber in c. 1000 m ü.d.M. (W. F. Winckel, kult. unter n. 194).

Wiederhold habe ich Exemplare dieser Pflanze in Buitenzorg gehabt, ohne dass es bis jetzt gelungen war sie zur Blüte zu bringen. Vor kurzem erhielt ich jedoch schönes, blühendes Material von Herrn W. F. Winckel und konnte dann feststellen, dass, wiewohl die Blüten denjenigen des *A. javanicum* Bl. nahezu vollkommen ähnlich sehen, wir mit einer unbeschriebenen Art zu tun hatten.

Die Art ist vor *A. javanicum* Bl. ausgezeichnet durch viel dünnere, steifere Stengel, schmälere, dunkler grüne, mehr glänzende Blätter, an der Spitze weniger aufreissende Scheiden, kleinere Blütenstände und ungefähr vierblütige Partialblütenstände.

Agrostophyllum tenue J. J. S.

Rhizom kurz, stark verzweigt. Stengel zahlreich, dicht beisammen, aufrecht, abstehend oder umgebogen, unverzweigt, dünn, auf dem Querschnitt elliptisch, glänzend, hellgrün, bis c. 85 cm lang, 0.2 – 0.3 cm, unterhalb des Blütenstandes bis c. 0.4 — 0.45 cm breit, vielblättrig, die Internodien 3 — 3.5 cm lang. Blätter aufrecht abstehend, linear, gegen die Spitze allmählich verschmälert, spitz 2zähnig, mit einem längeren Spitzchen, mit oben gefurchter, unten vorragender Mittelrippe, papierartig, glänzend dunkelgrün, c. 14 — 21 cm lang, 0.6 — 0.8 cm breit; Scheiden röhrig, auf dem Querschnitt elliptisch, an der Spitze vorn bald etwas aufreissend und schwarz berandet, blassgrün, länger als die Internodien. Blütenstände kopfförmig, nickend, halbkugelig, dicht vielblütig, bis 2.7 cm im Durchmesser, meistens kleiner, von bald vertrockneten, zerreissenden, c. 1 cm langen Scheiden umgeben. Partialblütenstände c. 4blütig, c. 1.3 cm lang; Pedunculus kurz, mit mehreren, nach oben grösser werdenden, am Grunde röhrigen, stumpfen Schaftblättern. Brakteen anliegend, konkav, rundlich verkehrt eirund, stumpf, 0.7 — 0.73 cm lang. Blüten weiss, c. 0.7 cm breit. Unpaares Sepalum ungefähr eirund, stumpf, mit einem sehr kleinen, kegeligen Spitzchen, ausser am Grunde konkav, c. 0.42 cm lang, 0.24 cm breit. Paarige Sepalen am Grunde mit den benachbarten Rändern verklebt und den Lippensack umfassend, konkav, breit und schief eirund dreieckig, spitzlich, c. 0.42 cm lang, 0.3 cm breit. Petalen weit abstehend, an der Spitze zurückgebogen, aus ungefähr ovalem Grunde ungefähr linear zugespitzt, stumpf, konvex, c. 0.375 cm lang, 0.1 cm. breit. Lippe etwas kürzer als die Säule, mit aufrechten, schwach abgerundeten Rändern der Säule beiderseits angedrückt, unten in der Mitte tief und schmal eingeschnürt, die Einschnürung innen in eine den Seitenrändern fast gleich hohen Querlamelle vorgezogen, im ganzen 0.35 cm lang; Hypochyl sackig, stumpf, von der Seite gesehen dreieckig; Epichyl kappenförmig, kurz dreilappig, ausgefressen c. 0.175 cm lang, mit stumpfen Seitenlappen und kaum längerem, breit dreieckigem, stumpfem Mittellappen. Säule ungefähr S-förmig, am Rücken allmählich, unten in $^2/_5$ über der Basis eckig gekrümmt, unten konkav, die Ränder vorbei der Mitte stumpfeckig, c. 0.36 cm lang; Clinandrium konkav, eirund, am Rande beiderseits ungefähr rechtwinkelig ausgeschnitten, an der Spitze breit abgestutzt. Anthere eirund, stumpf zugespitzt, blassbräunlich, 0.1 cm breit, mit rundlich höckerigem Konnektiv. Pollinien 8, schmal linear keulig, stumpf, blassgelb, mit rundlicher, brauner Klebmasse. Narbe klein, am unteren Rande mit einer weit abstehenden, viereckigen, abgestutzten, dem Rostellum gleich langen Querlamelle. Ovarium nicht gedreht, 6furchig, weiss, c. 0.6 cm. lang.

Ceratostylis sululata Bl. Bijdr. (1825), 306; etc.
var. **flavescens** J. J. S. n. var.

Caules c. 4.5—5.75 cm. longi, 0.2—0.22 cm. diam. Folium c. 1.7—2.4 cm. longum, 0.2—0.24 cm. latum. Flores pallide flavescentes, labello apice dilute flavo.

Java: Buitenzorg, Tjipatat (Bolang), 700 m ü. d. M. (Frau A. Risch-Loder, 1916.)

Die Varietät unterscheidet sich von der gewöhnlichen Form hauptsächlich durch die Blütenfärbung.

Eine Abbildung dieser Pflanze findet sich unter den Zeichnungen von Kuhl und Van Hasselt in Buitenzorg.

Dendrobium gracile Lndl. (nec J. J. S. neque Krzl.) Gen. et sp. Orch. (1830), 91; Miq. Fl. Ind. Bat. III (1855), 634. — *D. gedeanum* J. J. S. in Bull. Dép. Agr. Ind. néerl. n. XIII (1907), 29; Krzl. in Pflanzenr. IV. 50. II. B. 21 (1910), 232. — *Onychium gracile* Bl. Bijdr. (1825), 327. — *Callista gracilis* O. K. Rev. gen. pl. II, (1891), 654.

Ich habe bei meinem letzten Besuch in Leiden feststellen können, dass *D. gedeanum* J. J. S., wie ich vermutete, mit *D. gracile* Lndl. zusammenfällt. Im Leidener Herbarium sind die n. 902, 322—1506, —1507 und —1508 von Blume *Onychium gracile* oder *Dendrobium gracile* etikettiert. Bei der Nummer 902, 322—1506 ist dieser Name jedoch wieder durchgestrichen und in *O. tenellum* umgeändert. Falls ich nicht irre, dann lagen diese Exemplare früher unter den Dubletten. Bei zwei dieser Exemplare habe ich Blütenreste gefunden, die genügten um nun, nachdem ich die Blüte kenne, zu konstatieren, dass sie nicht von *D. gedeanum* verschieden sind.

Was die von Herrn Rolfe und mir als *D. gracile* bestimmte, in Kew kultivierte Pflanze ist, weiss ich nicht.

*__Dendrobium excavatum__ Miq. Fl. Ind. Bat. III (1855), 644; J. J. S. in Fl. Buit. VI, Orch. (1905), 341; Krzl. in Pflanzenr. IV. 50. II. B. 21 (1910), 219. — *Oxystophyllum excavatum* Bl. Bijdr. (1825), 336; Lndl. Gen. et sp. Orch. (1830), 72. — *Callista excavata* O. K. Rev. gen. pl. II (1891), 654.

Caules dependentes, elongati, praesertim inferne ramosi et ad basin ramulorum radicantes, compressi, dilute virides, dense foliati, ad c. 40 cm. longi, cum foliis c. 2.7—3 cm. lati, internodiis oblique cuneatis, c. 0.5—0.6 cm. longis, apice obliquo c. 0.33 cm. latis. Folia patentia, basi imbricantia, inarticulata, lateraliter compressa, anguste oblique lineari-lanceolata, apicem versus sensim angustata, acuta, sensim subulato-apiculata, subpungentia, basi supra ultra medium fissa, coriacea, rigidiuscula, opaca, leviter glauco-viridia, tota margine inferiore 3.2 cm., margine superiore 2.8 cm. longa, supra basin 0.6 cm. alta, vagina cuneato-tubulosa, lateraliter compressa. Inflorescentiae axillares, erectae, adpressae, breves, ramosae, succedanee paucos flores gignentes, pedunculo vagina folii incluso, c. 1.1 cm. longo, vaginulis imbricantibus

tubulosis acute acuminatis pallidis superne accrescentibus omnino incluso. Bractea ovarium includens et superans, triangula, acutissima, membranacea, semipellucida, c. 0.35 cm. longa. Flores carnosuli, extus nitiduli, c. 0.8 cm. lati, 0.9 cm. longi, sepalis petalisque pallide flavo-viridibus, apice excepto minute et inconspicue purpureo-punctatis. Sepalum dorsale ovarium continuum, medio leviter obtusangule recurvulum, ovatum, obtusum, apiculatum, approximato-trinervium, c. 0.43 cm. longum, 0.27 cm. latum. Sepala lateralia cum pede gynostemii mentum conspicuum conicum obtusum cum ovario angulum acutum faciens leviter incurvulum c. 0.37 cm. longum formantia, margine antico omnino libera, apice recurvula, oblique triangula, acuta, subulato-apiculata, trinervia, dimidiis proximis tantum purpureo-punctata, dorso sparse cinnamomee furfuracea, c. 0.475 cm. longa, margine antico bene 0.7 cm. metientia, basi 0.53 cm. lata. Petala divergentia, subelliptico oblonga, breviter subulato-acuminata, irregulariter marginata, 1nervia, convexa, membranacea, albida, parce purpureo-punctata, c. 0.33 cm. longa, 0.15 cm. lata. Labellum patens, simplex, concavulum, in $^3/_5$ partibus supra basin vix obtusangule recurvulum et intus sensim leviter transverse incrassatum, subtus convexum cum sulco longitudinali inconspicuo, explanatum ambitu subspathulato-oblongum, apice carnoso-conicum, obtusum, parte superiore (epichylio) marginibus incurvis incrassatis et costis 2 margini parallelis apice Λ-formiter confluentibus verrucoso-undulatis minute papillosis opacis ornatum, basi truncatum, $^2/_3$ partibus inferioribus margine papillosum, carnosum, nitidum, flavescenti-album, margine pallide purpureo-suffusum, intus purpureo-punctatum, incrassationibus epichylii rubris, c. 0.625 cm. longum, superne 0.26 cm. latum. Gynostemium brevissimum, latum, dorso convexum, virescens, absque anthera c. 0.1 cm. longum, filamento subulato, purpureo, auriculis brevibus, latis, subtruncatis, vix purpurascentibus. Anthera cucullata, oblique conica, antice plana, apice producta et late truncata, rubra, c. 0.075 cm. lata. Pollinia 4, parva, lateraliter compressa, oblique suborbicularia, exteriora extus convexa, interiora multo minora et tenuiora, semipellucide flava, bene 0.03 cm. diam. Stigma transversum, semilunatum. Pes gynostemii cum ovario angulum acutum faciens, incurvulus, lineari-oblongus, apicem versus leviter angustatus, obtusus, pallide viridis, apice atropurpureus, c. 0.37 cm. longus.

Ovarium curvatum, dilute viride, praesertim subtus furfuraceum, c. 0.25 cm. longum.

Java: Buitenzorg, auf dem Salak am Tjiapoes (Blume). Priangan, Tjadas Malang bei Tjibeber in c. 1100 m ü. d. M. (W. F. Winckel, kultiviert unter n. 309).

Borneo: Soengei Kenepai, Soengei Sekadouw. (H. Hallier, 1894 kult. in Hort. Bog. unter n. 395a).

Ich vermute, dass in dieser Pflanze die Blumesche Art vorliegt. Da jedoch das Original unvollständig und die Beschreibung äusserst kurz ist, wird Sicherheit kaum zu erlangen sein. Das in „die Orchideen von Java" erwähnte Exemplar von Borneo ist mit der hier beschriebenen Art identisch.

D. sinuatum Lndl. ist noch mit ihr zu vergleichen. Wiewohl Lindleys Beschreibung der Lippe einigermassen an *D. excavatum* Miq. erinnert, wäre aus den kurzen Diagnosen Ridleys und Kränzlins zu folgern, dass die Arten nicht identisch sind.

D. excavatum Miq. ist vor den anderen javanischen Arten dadurch ausgezeichnet, das der kegelige Fortsatz an der Unterseite der Lippe sich nicht unterhalb, jedoch an der Spitze befindet und daher wenig augenfällig ist. Auch die Schwielen auf der Oberseite der Lippenspitze sind sehr charakteristisch. Verwandt sind u. m. *D. nitidiflorum* J. J. S. und *D. bipulvinatum* J. J. S. von Neu-Guinea.

Bei dem Exemplar von Borneo habe ich in 1899 in starker Regenzeit kleistogame Blüten beobachtet.

*__Dendrobium exsculptum__ T. et B. in Nat. Tijdschr. Ned. Indië XXIV (1862), 316; etc.

var. **purpureum** J. J. S. n. var.

Caules et folia typi. Inflorescentiae ad c. 15florae, pedunculo sordide atropurpureo, parce pallide viridi-punctato, c. 1.9—2.2 cm. longo, vaginulis c. 6—7 brevibus tubulosis superne accrescentibus atropurpureis pallide viridi-punctatis 4 inferioribus approximatis ceteris remotis et in bracteas vergentibus ad c. 0.55 cm. longis donato, rachide fractiflexa, atropurpurea et pallide viridi, ad c. 4 cm. longa. Bracteae adpressae, triangulae, obtusae, apice erosulae, virides, atropurpureo-suffusae, ad c. 0.65 cm. longae.

Flores typi, c. 1.6 cm. longi, albi, valde purpureo-suffusi. Sepalum dorsale leviter concavum, dorso carinàtum, intus pallide purpurascenti-album, dorso purpureum, 1 cm. interdum superans. Sepala lateralia mentum reversum obtusum c. 0.53 cm. longum formantia, leviter concava, alba, dimidio sepalum dorsale versus spectante dorso purpureo-suffusa, c. 1 cm. longa, basi 0.7 cm. metientia. Petala alba, dorso fascia longitudinali pallide purpurascenti notata, c. 0.95 cm. longa, 0.45 cm. lata. Labellum intus magnam partem purpurascens, fascia longitudinali convexo-incrassata leviter superne distinctius 3costata, explanatum bene 1.3 cm. longum, bene 1 cm. latum, lobis omnibus longe crispule albo-ciliatis; lobi laterales intus dense verruculoso-muriculati, purpureo-striati; lobus intermedius purpureus, intus praesertim versus apicem muricibus parce ramulosis dense vestitus, c. 0.5 cm. longus et latus. Gynostemium album, subtus purpureo-notatum, pede albo, leviter purpureo-suffuso, costa in excavatione ochrascenti. Anthera antice rotundato-quadrangula, apice truncata erosulaque, alba. Stigma semiovale, basi rotundatum, apice truncatum. Ovarium pedicellatum atropurpureum, pallide viridi-punctatum, bene 1 cm. longum.

Java: Priangan, Tjidadap bei Tjibeber, in c. 1000 m ü.d.M. (W. F. Winckel, kultiviert unter n. 290, bl. im Februar 1917).

Die Varietät unterscheidet sich vom Typ durch mehrblütige Blütenstände und stark purpurn gefärbte Blüten.

Es ist aber nicht ausgeschlossen, dass die in Buitenzorg kultivierten Exemplare der Art, nach welchen meine Beschreibung angefertigt wurde, nicht sehr stark und daher die Blüten weniger zahlreich waren.

Dendrobium exsculptum T. et B. var. ***purpureum*** J. J. S.

Blütenstände bis 15blütig; Pedunculus dunkelpurpurn, blassgrün punktiert, 1.9—2.2 cm lang, mit c. 6—7 kurzen Schaftblättern; Rachis bis c. 4 cm lang. Blüten c. 1.6 cm lang, weiss, die Sepalen und Petalen besonders aussen stark purpurn angelaufen. Lippe innen mit einer 3rippigen Längsverdickung, innen zum grössten Teil blasspurpurn, die Lappen innen warzig weichstachelig und lang gewimpert; Seitenlappen innen purpurn gestreift; Mittellappen purpurn. Säule weiss, unten purpurn gezeichnet. Anthere weiss. Ovarium und Stielchen dunkelpurpurn.

*__Dendrobium Jacobsonii__ J. J. S. n. sp.

Rhizoma breve, ramosum, radicibus crassiusculis, rugosis. Caules numerosi, approximati, erecti, rigidi, simplices, leviter flexuosi et ad nodos leviter constricti, basi tenues, subteretes, sordide fusci, inferne defoliati, ad c. 19 cm. longi, internodiis brevibus, c. 0.35 – 0 6 cm. longis, in medio caulis c. 0.65 – 0.75 cm. diam. Folia parva, patentissima, recurva, subovata, apicem versus angustata, inaequaliter rotundato-biloba, basi lata semiamplexicaulia, apice minute erosula, costa media supra sulcata subtus apicem versus vix prominente, coriacea, vernicosa, atroviridia, praesertim margine et costa media sordide violaceo-tincta, subtus opaca, c. 0.95 – 1.7 cm. longa, 0.575 – 1 cm. lata; vaginae tubulosae, internodia paulo superantes, prominenter multinerviae, opacae, dilute virides, valde violaceo suffusae. Inflorescentiae ad nodos partis caulium defoliatae, vaginas 2 perforantes, breves, 1florae, pedunculo patente, tenui, nitide viridi, c. 0.75 cm. longo, vaginula ad basin. Bractea adpressa, triangula, acuta, concava, pallide ochrascens, rubro-tincta, c. 0.3 cm. longa. Flos mediocris, miniatus, c. 2.7 cm. longus, sepalis dorso vernicosis petalaque conniventibus. Sepalum dorsale subovali-ovatum, breviter acuminatum, minute triangulo-acutum, basi latum, planum, intus nitidulum et dilutius coloratum, c. 1 cm. longum, 0.525 cm. latum. Sepala lateralia lacinia elongata angusta obliqua concava ad pedem gynostemii decurrentia, mentum reversum cum ovario angulum anguste acutum faciens anguste subcylindrico-conicum apice marginibus anticis inferne longitudine c. 0.5 cm. connatis calcariforme curvulum obtusum praesertim inferne leviter lateraliter compressum c. 1.4 cm. longum formantia, parte antica oblique ovato-triangula, brevissime acute acuminata, concava, costa media dorso ad apicem incrassata, intus nitidula, extus dimidio sepalum dorsale versus spectante miniata, dimidio antico aurantiaco-miniata, intus aurantiaca cum apiculo viridi, c. 1 cm., tota 2.23 cm. longa, basi 1.8 cm., parte antica bene 0.8 cm. lata. Petala subelliptico-oblonga, apice recurvula, acuta, dorso sulco longitudinali instructa, dilutius aurantiaco-miniata, c. 0.95 cm. longa, 0.37 cm. lata. Labellum simplex, spathulatum, pedi gynostemii adpressum, concavum, exappendiculatum, sed intus supra basin convexo-incrassatum cum sulco longitudinali, subtus sulco longitudinali instructum, basi longitudine c. 0.9 cm. pedi gynostemii in formam calcaris adnatum, c. 2.15 cm. longum, ungue lineari, apicem versus sensim paulo dilatato, canaliculato, ochraceo, c. 1.1 cm. longo, medio fere 0.3 cm. lato, lamina rhombea, obtusiuscula, superne minutissime crenulata, dilutius aurantiaca, bene 1 cm. longa, 0.675 cm. lata. Gynostemium a dorso compressum, transverse quadrangulum, dorso convexum, nitidum, dilute aurantiacum, c. 0.36 cm. longum, 0.425 cm. latum, clinandrio transverso, profundo, filamento brevi, dentiformi, auriculis latis, obtusis, retusis. Anthera cucullata, transverse reniformis, antice visa subsemiorbicularis, apice truncata et albo-puberula, in utraque connectivi parte leviter excavata, dilute viridis, maculis 2 violaceis, c. 0.34 cm. lata. Stigma magnum, transversum, margine inferiore elevatum retusumque. Pes gynostemii cum ovario angulum anguste acutum faciens, $^1/_3$ superiore obtusangule incurvus, linearis, apicem versus angustatus, obtusus, canaliculatus, c. 1.4 cm. longus. Ovarium conspicuum, curvulum, apice valde obliquum, 6sulcatum, vernicosum, miniatum, inferne viridi-suffusum, c. 1.4 cm. longum; pedicellus tenuior, angulatus, c. 1 cm. longus.

Java: Auf dem Lawoe, in 2800—2900 m ü. d. M. (E. Jacobson, bl. im Dezember 1916).

Eine sehr augenfällige, auch im sterielen Zustande leicht kenntliche Art der Sektion *Pedilonum*, die nach den Mitteilungen des Herrn Jacobson in den höchsten Regionen des Lawoe viel vorkommt. Unter den javanischen Arten steht die Pflanze isoliert da.

Es ist merkwürdig, dass in dem in viel niederer Höhe liegenden Bandoeng im Garten des Herrn Dr. W. Docters van Leeuwen zur Blüte gelangte Exemplare nicht nur kleinere und blasser gefärbte Blüten hervorbrachten, aber besonders, dass auch die Form sich änderte. Dass Kinn war nicht gebogen und spitzer, während auch die Lippe Abweichungen zeigte. Die Infloreszenzen der kultivierten Pflanzen waren ansserden bisweilen 2blütig.

Dendrobium Jacobsonii J. J. S.

Rhizom kurz, mit runzeligen Wurzeln. Stengel genähert, aufrecht, unverzweigt, schwach zickzackig, an den Knoten etwas eingeschnürt, ungefähr drehrund, kurzgliedrig, der untere Teil allmählich entblättert, bis c. 19 cm lang, in der Mitte 0.65 – 0.75 cm dick. Blätter klein, weit abstehend, zurückgebogen, ungefähr eirund, ungleich abgerundet 2 lappig an der Spitze, mit breiter Basis halbstengelumfassend, ledrig, glänzend, dunkelgrün und schmutzig violett überlaufen, unten matt, c. 0.95 – 1.7 cm lang, 0.575 – 1 cm breit; Scheiden röhrig, matt hellgrün, stark violett überlaufen. Blütenstände an den Knoten des entblätterten Stengelteiles, 2 Scheiden durchbohrend, kurz, 1blütig; Pedunculus dünn, 0.75 cm lang. Braktee dreieckig, spitz, c. 0.3 cm lang. Blüte mittelgross, menigrot, aussen glänzend, c. 2. 7 cm lang. Unpaares Sepalum ungefähr eirund, kurz zugespitzt, spitz, flach, c. 1 cm lang, 0.525 cm breit. Paarige Sepalen mit einem langen, schmalen Streifen am Säulenfuss herablaufend, ein mit dem Ovarium einen spitzen Winkel bildendes, dünn kegeliges, schwach gebogenes, an der Spitze durch Verwachsung der Ränder spornförmiges, c. 1.4 cm langes Kinn darstellend, der freie Teil schief eirund dreieckig, sehr kurz zugespitzt, konkav, c. 1 cm lang, an der Basis 1.8 cm breit. Petalen schwach elliptisch länglich, spitz, c. 0.95 cm lang, 0.37 cm breit. Lippe dem Säulenfuss angedrückt, einfach, spatelig, konkav, am Grunde dem Säulenfuss c. 0.9 cm angewachsen, c. 2.15 cm lang; Nagel linear, über der Basis verdickt, ockergelb, c. 1.1 cm lang, in der Mitte fast 0.3 cm breit; Platte rautenförmig, stumpf, nach oben sehr klein gekerbt, ziemlich hellorange, gut 1 cm lang, 0.675 cm breit. Säule vom Rücken zusammengedrückt, quer viereckig, glänzend, hellorange, 0.36 cm lang, 0.425 cm breit; Öhrchen breit, ausgerandet. Anthere nierenförmig, an der Spitze abgestutzt und kurz weiss behaart, hellgrün mit 2 violetten Fleckchen, 0.34 cm breit. Narbe gross, mit erhabenem, ausgerandetem Unterrande. Säulenfuss mit dem Ovarium einen kleinen, spitzen Winkel bildend, linear, rinnig, c. 1.4 cm lang. Ovarium gross, gebogen, mit sehr schiefer Spitze, 6furchig, glänzend, mennigrot, 1.4 cm lang; Stielchen dünner, 1 cm lang.

***Eria tjadasmalangensis** J. J. S. n. sp.

Caules approximati, validi, elongati, sectione transversa ellip-

tici, nitidi, dilute virides, c. 37 cm. longi, 1.25 cm. lati, c. 9folii, basi vaginati. Folia patentia, loriformia, apice angustata et valde obliqua vel oblique biloba, latere longissimo oblique anguste obtusa, basi conduplicato-canaliculata, costa media supra sulcata subtus prominente, coriacea, satis sordide atroviridia, subtus nervis c. 5 prominulis exceptis pallidiora, c. 18—50 cm. longa, 2.1—2.9 cm. lata; vaginae internodiis multo longiores, tubulosae, superne antice rumpentes. Inflorescentiae c. 5 pseudoterminales, elongatae, dense multiflorae, cylindricae, diu florentes, pedunculo stellato-puberulo, c. 10 cm. longo, dilute viridi, pluribus vaginulis bracteiformibus ad c. 0.6 cm. longis donato, rachide dilute viridi, dilute fusco-pubescenti, c. 42 cm. longa. Bracteae persistentes, deinde reflexae, triangulae, acutae, concavae, pubescentes, dilute virides, c. 0.2—0.3 cm. longae. Flores vagi, patentissimi, parvi, c. 0.6 cm. lati, sepalis dorso pubescentibus petalisque sordide flavis minute badio-maculatis. Sepalum dorsale erectum, cum ovario angulum rectum faciens, subellipticum, obtusum, acute conico-apiculatum, basi latum, concavum, medio tantum maculatum, c. 0.4 cm. longum, 0.24 cm. latum. Sepala lateralia ad pedem gynostemii decurrentia, oblique triangulo-ovata, apice vix contracta, obtusa, concava, basi convexa, dorso ad apicem incrassata, apice immaculata, c. 0.4 cm. longa et supra basin aequilata. Petala oblique oblonga, basin versus vix angustata, apice recurva, obtusa, convexa, undulata, apice crenulata, basi apiceque immaculata, c. 0.35 cm. longa, 0.14 cm. lata. Labellum cum pede gynostemii angulum rectum formans, porrectum, 3lobum, 3costatum, costa media omnino farinosa in medio lobi intermedii in callum magnum oblique erectum trigono-ovoideum obtusum postice ad basin verrucam gerentem exeunte, callo transverso alto a dorso compresso 3lobo farinoso apici pedis gynostemii adpresso ad basin, lobulo intermedio lateralibus majore, costis exterioribus rectis superne leviter divergentibus altis intermedia multo brevioribus lateraliter compressis glabris in apicem liberum sinus inter lobos vix superantem exeuntibus, explanatum c. 0.4 cm., usque ad apicem loborum lateralium 0.35 cm. longum, 0.5 cm. latum; lobi laterales patentes, ambitu $^1/_3$ orbiculi, fere ad medium liberi, parte libera oblique trianguli, obtusi, margine antico recti, margine postico rotundati, convexi, pallide flavescentes, transverse sordide purpureo-fusco maculati, margine antico c. 0.18 cm. longi; lobus

intermedius lateralibus paulo longior, recurvus, e basi breviter unguiculato-contracta valde dilatatus, transverse oblongus, apice truncatus et irregulariter lacinulatus, quam lobos laterales grossius maculatus, c. 0.2 cm. longus, bene 0.3 cm. latus. Gynostemium brevissimum, cum ovario angulum acutum faciens, dorso convexum, pallide flavescens, lateribus sordide purpureum, c. 0.1 cm. longum, clinandrio concavo. Anthera plano-cucullata, transverse quadrangulo-oblonga, basi bilobula, connectivo convexo-incrassato orbiculari ovato, dilute sordide purpurea, c. 0.1 cm. lata. Pollinia 8, pyriformia, flavescenti-alba, cum glandula brevi c. 0.075 cm. longa. Rostellum recurvulum, obtusum, concavum. Stigma transverse oblongum. Pes gynostemii ovarium fere continuus, rectus, linearis, pallide flavescens, purpureo-marginatus, usque ad apicem ovarii c. 0.175 cm., cum gynostemio 0.35 cm. longus. Ovarium c. 0.3 cm. longum, cum pedicello tenuiore c. 0.325 cm. longo fuscescenti-pubescens.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber, in c. 1100 m ü. d. M. in einem Baum zwischen *Eria latifolia* Rchb. f. und *E. monostachya* Lndl. (R. C. Bakhuizen van den Brink, bl. im Dezember 1916, kult. in Hort. W. F. Winckel unter n. 275).

Diese Pflanze sieht *E. latifolia* Rchb. f. am ähnlichsten, ist jedoch verschieden durch längere Stengel, heller gefärbte Blüten, ein spitzes unpaares Sepalum, eine breitere Lippe mit längeren Seitenlappen, einem viel grösseren, genagelten Mittellappen und stärkeren seitlichen Leisten.

Es scheint mir nicht ausgeschlossen, dass die Pflanze ein Bastard ist. Sie wurde von Herrn R. C. Bakhuizen van den Brink an einigen wenigen Stellen angetroffen.

Eria tjadasmalangensis J. J. S.

Stengel dicht beisammen, verlängert, auf dem Querschnitt elliptisch, glänzend hellgrün, c. 37 cm lang, 1.25 cm breit, c. 9blättrig. Blätter abstehend, riemenförmig, mit sehr ungleicher, wohl oder nicht zweilappiger Spitze, ledrig, dunkelgrün, c. 18—50 cm lang, 2.1—2.9 cm breit; Scheiden viel länger als die Internodien, röhrig. Blütenstände c. 5, pseudoterminal, verlängert, dicht vielblütig; Pedunculus kurz sternhaarig, c. 10 cm lang, hellgrün, mit mehreren kleinen Schaftblättern; Rachis hellbraun behaart, c. 42 cm lang. Brakteen bleibend, bald zurückgeschlagen, dreieckig, spitz, hellgrün, c. 0.2—0.3 cm lang. Blüten klein, c. 0.6 cm breit, aussen behaart, mit schmutzig gelben, klein braungefleckten Sepalen und Petalen. Unpaares Sepalum aufrecht, nahezu elliptisch, mit breiter Basis und stumpfer, mit einem Spitzchen versehener Spitze, konkav, c. 0.4 cm lang, 0.24 cm breit. Paarige Sepalen schief dreieckig eirund, stumpf, aussen an der Spitze verdickt, konkav, c. 0.4 cm lang und breit. Petalen schief länglich, gegen die Basis etwas verschmälert, mit zurückgebogener, stumpfer Spitze, konvex, wellig, c. 0.35 cm lang, 0.14 cm breit. Lippe mit dem Säulenfuss einen rechten Winkel bildend, 3lappig, hellgelb, quer braungefleckt, ausgespreizt c. 0.4 cm, bis zur Spitze der Seitenlappen 0.35 cm lang, 0.5 cm breit, 3rippig, die mittlere Rippe mehlig, in der Mitte des Mittellappens in einen schräg aufrechten, dreikantig kegeligen, stumpfen, an der Basis mit einer kleinen Warze versehenen, mehligen Callus ausgehend, an der Basis mit einem 3lappigen, mehligen Quercallus, dessen mittlerer Teil am grössten ist, die seilichen Leisten viel kürzer, von der Seite zusammengedrückt, kahl, in eine etwas vorbei der Basis des Mittellappens reichende freie Spitze ausgehend; Seitenlappen abstehend, der vordere Teil schief dreieckig mit geradem Vorder- und abgerundetem Hinterrande, stumpf, konvex, am Vorderrande 0.18 cm lang; Mittellappen etwas länger als die Seitenlappen, zurückgebogen, aus kurz nagelförmig zusammengezogener Basis quer rechtwinkelig länglich verbreitert, an der Spitze abgestutzt und unregelmässig zackig, 0.2 cm lang, gut 0.3 cm breit. Säule sehr kurz, mit dem Fruchtknoten einen spitzen Winkel bildend, gelb und rot gefärbt, 0.1 cm lang. Anthere flach kappig, quer rechtwinkelig länglich, an der Basis mit 2 Läppchen, mit konvexem Konnektiv, schmutzig hellpurpurn, 0.1 cm breit. Pollinien 8, keulig, gelblichweiss. Narbe quer länglich. Säulenfuss nahezu in die Verlängerung des Fruchtknotens, linear, purpurn berandet, 0.175 cm, mit der Säule 0.35 cm lang. Fruchtknoten 0.3 cm lang, mit dem 0.325 cm langen Stielchen hellbraun behaart.

Eria Koordersii J. J. S. n. sp.

Caules validi, crassi, vaginis magnis erecto-patentibus triangulis

conduplicatis coriaceis (in sicco) ad c. 11 cm. longis basin versus decrescentibus tecti, apice 4 folii, (pars adest 13 cm. longa). Folia lanceolata, aicem versus angustata (apice deficiente), basin versus canaliculato angustata, nervis majoribus c. 9 dorso prominentibus, nervis minoribus pluribus, nervo medio supra sulcato, coriacea, c.27 — 32 cm. longa, 5.75 — 4 cm. lata; vaginae breves, latae. Inflorescentiae ex axilla vaginarum infra folia, subsessiles, foliis multo breviores, dense multiflorae, cylindricae, c.14.5 cm. longae, rachide puberula. Bracteae reflexae, oblongae, obtusae, ad c. 0.4 cm. longae. Flores in sectione inter majores. Sepalum dorsale oblongum, obtusum, c. 0.575 cm. longum, 0.3 cm. latum. Sepala lateralia cum pede gynostemii mentum magnum obtusum c. 0.55 cm. longum formantia, oblique triangula, obtusa, c. 0.5 cm. longa, 0.6 — 0.67 cm. lata. Petala oblonga, obtusa, 3nervia, c. 0.55 — 0.6 cm. longa, 0.25 — 0.33 cm. lata. Labellum erectum, apice recurvum, vix 3lobum, 3nervium, expansum c. 0.6 — 0.7 cm. usque ad apicem loborum lateralium c. 0.225 cm. longum; lobi laterales basilares, ante basin lobi intermedii membrana transversa conjuncti, hypochylium suborbiculare apice truncatum vel late retusum et irregulariter marginatum valde concavum c. 0.35 cm. latum pedi gynostemii adpressum formantes; lobus intermedius spathulatus, expansus c. 0.56 — 0.575 cm. longus, ungue late lineari, lamina valde dilatata, lateribus incurva, transverse rhombea, obtusa, subcrenulata, intus papillosa, c. 0.25 cm. longa, 0.5 — 0.53 cm. lata. Gynostemium breve, c. 0.2 cm. longum. Anthera cucullata, transversa, apice lato utrinque in dentem subulatum exeuns, c. 0.17 cm. lata. Pes gynostemii cum ovario angulum acutum faciens, rectus, c. 0.45 — 0.5 cm. longus. Ovarium pedicellatum puberulum, c. 0.95 cm. longum.

Java: Bandoeng, im Urwalde Pantjoer bei Tjigenteng in 1700 m ü. d. M. (S. H. Koorders n. 26404β, Mantri Tirto, bl. im Januar 1897). Tangkoeban Prahoe. (W. Docters van Leeuwen n. 2473, bl. im Dezember 1916).

Die Art erinnert habituell an *L. rhynchostyloides* O'Brien ist jedoch verschieden durch breitere Blätter, anders gefärbte Blüten, eine gerade Lippe mit an der Spitze nicht oder kaum freien Seitenlappen.

Die Beschreibung ist nur nach dem vom Mantri Tirto gesammelten Material angefertigt. Ich bin jetzt in der Lage sie zu ergänzen nach dem von Docters van Leeuwen gefundenen Exemplar.

Der Stengel ist im ganzen c. 22.5 cm lang und (trocken) 2 cm breit, die Blätter sind stumpf und etwas 2lappig an der Spitze. Die Blüten, besonders die Lippe, zeigen einige Unterschiede. Das Hypochyl ist kleiner, der Mittellappen schmäler als beim Exemplar von Pantjoer.

Vom Mantri Tirto werden die Blüten einfach rot genannt; nach Dr. W. Docters van Leeuwen sind sie eigenartig hellweinrot mit weissen Spitzen.

Eria Koordersii J. J. S.

Stengel kräftig, dick, mit grossen, abstehenden, dreieckigen, zusammengelegten, in sicco ledrigen, bis c. 11 cm langen, nach unten hin kleiner werdenden Scheiden, gegen die Spitze 4blättrig, (anwesendes Stück 13 cm. lang). Blätter schmal lanzettlich, gegen die Spitze verschmälert, (Spitze fehlend), am Grunde stielförmig verschmälert und rinnig, mit c. 9 grösseren, unten vorragenden und mehreren kleineren Nerven, der Mittelnerv oben gefurcht, ledrig, c. 27—32 cm. lang, 5.75—4 cm. breit; Scheiden kurz, breit. Blütenstände aus dem Winkel der Scheiden unterhalb der Blätter hervorbrechend, nahezu sitzend, viel kürzer als die Blätter, dicht vielblütig, zylindrisch, c. 14.5 cm lang; Rachis kurz flaumhaarig. Brakteen zurückgeschlagen, länglich, stumpf, bis c. 0.4 cm lang. Blüten für die Sektion gross. Unpaares Sepalum länglich, stumpf, c. 0.575 cm lang, 0.3 cm breit. Paarige Sepalen mit dem Säulenfuss ein grosses, stumpfes, c. 0.55 cm langes Mentum bildend, schief dreieckig, stumpf, 5nervig, c. 0.5 cm lang, 0.6—0.67 cm breit. Petalen länglich, stumpf, 3nervig, c. 0.55—0.6 cm lang, 0.25—0.33 cm breit. Lippe aufrecht, mit zurückgebogener Spitze, 3lappig, 3nervig, ausgespreizt c. 0.6—0.7 cm, bis an die Spitze der Seitenlappen c. 0.225 cm lang; Seitenlappen grundständig, vor der Basis des Mittellappens durch eine Quermembran verbunden, mit sehr kurzer, freier, stumpfer Spitze, ein ungefähr rundes, an der Spitze breit eingedrücktes, stumpf 2zähniges, stark konkaves, c. 0.35 cm breites, dem Säulenfuss angedrücktes Hypochyl bildend; Mittellappen spatelig, ausgespreizt c. 0.56—

0.575 cm lang, mit breit linearem Nagel und stark verbreiterter, an den Ecken aufwärts gebogener, quer rautenförmiger, stumpfer, etwas gekerbter, c. 0.25 cm langer, 0.5—0.53 cm breiter Platte. Säule kurz, c. 0.2 cm lang. Anthere kappig, quer, an der breiten Spitze beiderseits in einen pfriemlichen Zahn ausgehend, c. 0.17 cm breit. Säulenfuss mit dem Ovarium einen grossen, spitzen Winkel bildend, gerade, c. 0.45—0.5 cm lang. Ovarium mit Stielchen c. 0.95 cm lang, kurz flaumharig.

***Bulbophyllum tjadasmalangense** J. J. S. n. ps. Rhizoma longe repens, ramosum, teres, longitudinaliter costatum, ad basin pseudobulborum tantum radicans, vaginis tubulosis tectum, cum vaginis c. 0.1 cm. diam. Pseudobulbi c. 0.65—1.6 cm. distantes, erecti, oblique ovoidei, obtusi, dilute virides, c. 0.5—0.65 cm. longi, 0.3—0.375 cm. diam, 1folii. Folium erectum, ovatum, obtusum, abrupte longiuscule mucronato-acuminatum, basi abrupte et brevissime contractum, supra in utraque parte costae mediae sulcatae subtus vix prominentis convexum, opace viride, subtus pallidius, c. 0.65—0.95 cm. longum, 0.45—0.7 cm. latum. Inflorescentiae e basi pseudobulborum ortae, folio breviores. 1florae, pedunculo tenui, c. 0.55 cm. longo, inferne nonnullis vaginulis tubulosis acuminatis donato. Bractea tubulosa, subulato-acuminata, pallida, c. 0.16 cm. longa. Flos parvus, tener, pallide virescens, c. 0.65 cm. longus, sepalis parallelis. Sepalum dorsale e basi triangula concava c. 0.23 cm. longa 0.13 cm. lata filiformi-subulato-contractum, totum c. 0.65 cm. longum. Sepala lateralia mentum breve cum ovario angulum obtusum faciens obtusangulum formantia, e basi oblique triangula concava c. 0.17 cm. longa 0.15 cm. lata filiformi-subulato-contracta, c. 0.63 cm. longa. Petala parva, porrecta, oblique elliptica, oblique acuta, in utraque parte canaliculae longitudinalis convexa, c. 0.13 cm. longa, 0.06 cm. lata. Labellum parvum, mobile, curvatum, oblongum, obtusum, inferne marginibus erectis canaliculatum, parte antica convexum, marginibus quam partem medianam tenuius, subtus papillosum, medio dilute viride, margine albidum, inexplanatum c. 0.1 cm. longum. Gynostemium breve, album, c. 0.05 cm. longum, clinandrio concavo, filamento e basi triangula subulato. Anthera cucullata, connectivo gibboso-incrassato. Pollinia oblique ovalia, pallide flava, c. 0.02 cm. longa. Stigma majusculum, triangulum. Pes gynoste-

mii cum ovario angulum obtusum faciens, rectus, linearis, dilute viridis, c. 0.075 cm. longus. Ovarium 6sulcatum, pallide viride, c. 0.1 cm. longum; pedicellus viridi-albus, c. 0.2 cm. longus.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber in c. 1000 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im November 1916 und Januar 1917, kult. in Hort. W. F. Winckel unter n. 262). Tjitjoeroek und Tjisokan bei Tjibeber in c. 800 m ü.d.M. (R. C. Bakhuizen van den Brink, bl. im April 1917).

Die Art ist vielleicht am besten in die Sektion *Nematorhizus* zu stellen. Sie hat in Java bis jetzt keine näheren Verwandten.

Bulbophyllum tjadasmalangense J. J. S.

Rhizom weit hinkriechend, verzweigt, stielrund, längsrippig, nur am Grunde der Trugknollen wurzelnd, mit den röhrigen Scheiden c. 0.1 cm dick. Trugknollen c. 0.65 – 1.6 cm entfernt, aufrecht, schief eiförmig, stumpf, hellgrün, c. 0.5 – 0.65 cm lang, 0.3 – 0.375 cm dick, 1blättrig. Blatt aufrecht, eirund, stumpf, abgebrochen in ein ziemlich langes Spitzchen zugespitzt, am Grunde sehr kurz und abgebrochen zusammengezogen, oben beiderseits der oben gefuhrchten, unten kaum vorragenden Mittelrippe konvex, matt grün, unten heller, c. 0.65 – 0.95 cm lang, 0.45 – 0.7 cm breit. Blütenstände am Grunde der Trugknollen, kürzer als das Blatt, 1blütig; Pedunculus dünn, c. 0.55 cm lang, mit wenigen röhrigen, zugespitzten Schaftblättern. Braktee röhrig, pfriemlich zugespitzt, blass, c. 0.16 cm lang. Blüte klein, zart, blass grünlich, c. 0.65 cm lang. Sepalen parallel, aus dreieckigem, konkavem Grunde pfriemlich fadenförmig zusammengezogen, c. 0.65 cm lang, die paarigen schief. Petalen klein, schief elliptisch, spitz, c. 0.13 cm lang, 0.06 cm breit. Lippe beweglich, gekrümmt, länglich, stumpf, der untere Teil rinnig, der vordere Teil konvex, unten papillös, hellgrün mit weisslichem Rande, c. 0.1 cm lang. Säule kurz, weiss, c. 0.05 cm lang; Filament aus dreieckiger Basis pfriemlich. Anthere kappig, mit höckerig verdicktem Konnektiv. Pollinien schief oval, blassgelb. Narbe ziemlich gross. Säulenfuss mit dem Ovarium einen stumpfen Winkel bildend, gerade, linear, hellgrün, c. 0.075 cm. lang. Ovarium 6furchig, blassgrün, c. 0.1 cm lang; Stielchen grünweiss, 0.2 cm lang.

***Bulbophyllum javanicum** J. J. S. comb. nov.— *B. Epicrianthes* J. J. S. (non Hook. f.) in Fl. Buit. VI, Orch. (1905), 447.—*Epicrianthes javanica* Bl. Bijdr. (1825), 306; Tab. fig. 8; Fl. Jav. Praef. VI; Lndl. Gen. et sp. Orch. (1830), 61; Miq. Fl. Ind. Bat. III (1855), 654.—*Phyllorchis javanica* O. K. Rev. Gen. pl. II (1891), 676.

Rhizoma elongatum, dependens, apice incurvulum, saepe pauciramosum, teres, dilute viride, c. 35 cm. longum, 0.15 cm. diam., vaginis tubulosis obtusis ad breviter acuminatis mox exarescentibus persistentibus radices rhizomati adpressas occultantibus ad c. 1.6 cm. longis omnino obtectum. Pseudobulbi biseriales, c. 0.8—1.7 cm. dissiti, basi rhizomati adpressi, plus minusve recurvi, patentes, oblongi, inaequaliter quadranguli, lateribus sulcati vel concavi, truncati, nitidi, dilute virides, praesertim adulti flavo-suffusi, mox rugulosi, c. 1.3—1.5 cm. longi, 0 575—0.6 cm. diam., initio vagina superiore inclusi, 1folii. Folium patentissimum, ellipticum, obtusum, valde convexum, marginibus recurvis acutis, costa media supra canaliculata, rigide carnosum, supra nitide viride, subtus opacum, c. 2.7—4.5 cm. longum, 1.45—2 cm. latum. Inflorescentiae ad basin pseudobulborum fasciculatae, brevissimae, 1florae, pedunculis c. 0.35 cm. longis, furfuraceo-punctatis. Bractea e basi arcte tubulosa ampliata, apice recurva, c. 0.4 cm. longa. Flos mediocris, c. 1.4 cm. latus, sepalis carnosulis, margine non attenuatis sed angulatis, ochraceis, basi parce purpureo-punctatis, dorso furfuraceo-punctatis. Sepalum dorsale ovatum, breviter subulato-acuminatum, concavum, 5nervium, nervis tenuioribus interpositis, c. 1 cm. longum, 0.48 cm. latum. Sepala lateralia oblique ovata, breviter acuminata, basi convexa, superne concava, 7nervia, bene 1 cm. longa, supra basin 0.5 cm. lata. Petala singularia, basi lata ad pedem gynostemii decurrentia, brevissima, utrinque in lobulum triangulum falcato-recurvum inaequimagnum appendices clavatas c. 3—5 exterius decrescentes gerentem producta, medio appendice septima vel undecima interposita, pallide flavescentia, interdum vix purpureo-suffusa, appendicibus rectis, linearibus, basi apiceque obtusis, compressis, crassiusculis, purpureo nigris, c. 0.23—0.4 cm. longis, stipitibus tenuiter filiformibus albidis ad c. 0.14 cm. longis, exterioribus decrescentibus, absque appendicibus basi c. 0.3 cm., ad lobulos 0.34 cm. lata, medio 0.04 cm. longa. Labellum mobile, porrectum, linguiforme, subrectum, leviter undatum, carnosum, basi lobis 2 reversis verticalibus rotundatis donatum, pulvinis 2 convexis vesiculosis subtus canalicula separatis et antice in formam costarum convexarum productis utrinque supra basin, supra costis 2 a lobis basilaribus decurrentibus supra basin approximatis ante pulvinos vesiculosos divergentibus, dimidio inferiore longitudinaliter sulcatum, sulco costis 2 minoribus antice evanescentibus limitato, parte antica oblongo-ovata, obtusa, convexa, rugulosa, utrinque velutino-hirtella, purpureo-nigrum, basi nitide purpureum, costis supra basin ochrascentibus purpureo-punctatis, totum c. 0.725 cm. longum, ad pulvinos 0.26 cm., parte antica 0.18 cm. latum. Gynostemium cum ovario angulum obtusum faciens, crassiusculum, marginibus in utraque stigmatis parte obtuse triangulo-dilatatum, ochrascens, apice atropurpureum, absque anthera c. 0.25 cm. longum, clinandrio truncato, irregulariter denticulato, auriculis brevibus, triangulis, margine antico dente parvo instructis. Anthera cucullata, suborbicularis, in rostrum conspicuum obtusangule recurvum valde convexum quadrangulum subbilobulum producta, connectivo convexo-incrassato, purpurascens, margine apicali dilute viridis, c. 0.125 cm. longa. Stigma suborbiculare. Pes gynostemii cum ovario angulum obtusum faciens, incurvus, apice dilatatus et in lobulos 2 divergentes obtusos exeuns, flavescens, parce purpureo-punctatus, c. 0.24 cm. longus. Ovarium pedicellatum 6sulcatum, praesertim apice furfuraceum, c. 0.95 cm. longum. Fructus fusiformis, apice leviter basi abrupte contractus, alte 6canaliculatus, viridis, sulcis flavescens, totus c. 2 5 cm. longus, 0.8—0.85 cm. diam., valvis 6 basi apiceque connatis dehiscens, seminibus pallide aurantiacis.

Java: Banten, Leuwiboengoer, nördlich vom Goenoeng Kentjana in 70 m ü. d. M. (J. C. van Hasselt). Buitenzorg, am Tjiapoes ketjil. Priangan, Tjisokan und Tjadas Malang bei Tjibeber, in 1000 und 800 m ü. d. M. (W. F. Winckel und R. C. Bakhuizen van den Brink, das ganze Jahr blühend, kult. unter n. 242).

Nach dem lebenden, von Herrn W. F. Winkel erhaltenen Material habe ich jetzt eine ausführliche Beschreibung dieser merkwürdigen Art anfertigen können.

Wiewohl die Zahl der Petalenanhängsel meistens grösser ist, stim-

men die Blütenmerkmale so gut mit den Blumeschen Figuren und Original überein, dass ich nicht daran zweifle, dass die Bestimmung richtig ist.

Hooker f. hat (in Fl. Brit. Ind. V, 753) für eine Pflanze von Perak den Namen *Bulbophyllum Epicrianthes* Hook. f. angenommen, in der Meinung, dass sie mit der javanischen Art identisch sei. Nach der nur sehr kurzen Beschreibung soll die javanische Pflanze verschieden sein durch stumpfe Blätter, grössere Blüten, die Zahl der Petalenanhängsel und die stumpfe Lippe. Da auch die Ridleysche Beschreibung (Materials Fl. Mal. Penins. I (1897), 68) keine Aufklärung giebt und in Süd-Sumatra neulich eine verwandte Art, *B. vesiculosum* J. J. S., nachgewiesen wurde, sehe ich mich veranlasst, die javanische Pflanze als eigene Art wieder herzustellen, und zwar unter dem alten Blumeschen Artsnamen.

Die Anhängsel der Petalen sind so leicht, dass sie schon bei dem geringsten Atemzug in Bewegung geraten.

Die früher im Botanischen Garten kultivierten, nach dem Namenschildchen von Ambon stammende Pflanze, die ich damals unter *B. Epicrianthes* zitierte, gehört sicher nicht hierher, ist jedoch *B. vesiculosum* viel ähnlicher.

***Bulbophyllum scotiifolium** J. J. S. n. sp.

Rhizoma elongatum, dependens, ramosum, genuflexum, teres, c. 20 cm. longum, 0.14 cm. diam., vaginis tubulosis acutis mox exarescentibus fuscis apice pallidis omnino obtectum, radicibus adpressis. Pseudobulbi parvi, c. 2.7—1 cm. dissiti, rhizomati adpressi, oblongo-subovoidei, latere rhizoma versus spectante excavati, apice truncati, dilute virides, c. 0.45—0.5 cm. longi, 0.2—0.3 cm. lati, 1folii. Folium crasse carnosum, lineare, sectione transversa transverse subovale, subtus valde convexum, supra obtusangule canaliculatum, breviter apiculatum, basi breviter petiolato-contractum, dilute viride, c. 2—3.2 cm. longum, 0.3—0.4 cm. latum. Inflorescentiae ad nodos rhizomatis plerumque geminatae, brevissimae, 1florae, pedunculo rhizomati adpresso, tereti, albido, c. 0.23 cm. longo, vaginulis c. 2 amplectentibus tubulosis albidis ad c. 0.2 cm. longis instructo. Bractea e basi tubuloso-infundibuliformi ovarium totum includente triangulo-producta, sepalo dorsali adpressa, acuta, concava, carinata, albida,

semipellucida, c. 0.2 cm. longa. Flos parvus, flavescenti albus, c. 0.65 cm. longus, sepalis subparallelis, paulo divergentibus. Sepalum dorsale e basi oblongo-triangula concava c. 0.26 cm. longa vix 0.1 cm. latiore in subulam teretem contractum, totum c. 0.65 cm. longum. Sepala lateralia e basi suboblique triangula concava c. 0.25 cm. longa 0.1 cm. vix latiore in subulam teretem contracta, tota c. 0.6 cm. longa. Petala gynostemio parallela, parva, rhombea, obtusa, c. 0.15 cm. longa, 0.07 cm. lata. Labellum parvum, mobile, membrana anguste quadrangula pedi gynostemii insertum, ovato-triangulum, concavum, apice brevissime recurvo convexum, obtusum, basi rotundato-truncatum, basi dilute citrinum, ceterum flavescenti-album, c. 0.14 cm. longum, 0.07 cm. latum. Gynostemium brevissimum, album, absque anthera c. 0.05 cm. longum, apice triangulo, dorso convexo, acuto, auriculis aequilongis, triangulis. Anthera cucullata, supra visa suborbicularis, apice subexciso-truncata, c. 0.025 cm. lata. Pollinia lateraliter compressa, subsemiorbicularia, pallide flavescentia. Rostellum quadrangulum, truncatum. Stigma magnum, subobovato-orbiculare. Pes gynostemii cum ovario angulum obtusum faciens, brevis, oblongus, truncatus, convexus, flavescens, c. 0 05 cm. longus. Ovarium sessile, brevissimum, obconicum, 6sulcatum, flavescens, c. 0.06 cm. longum.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber, in c. 1000 m ü. d. M. (W. F. Winckel, bl. im Januar 1917, kult. unter n. 210).

Eine durch die eigentümliche Blattgestalt leicht kenntliche Art der Sektion *Oxysepalum*.

Bulbophyllum scotiifolium J. J. S.

Rhizom verlängert, herabhängend, verzweigt, kniebeugig, stielrund, c. 20 cm lang, 0.14 cm im Durchmesser, völlig von röhrigen, spitzen, trocknen, braunen, an der Spitze blassen Scheiden bedeckt und mit angedrückten Wurzeln. Trugknollen klein, c. 2.7 – 1 cm. auseinander, dem Rhizom angedrückt, ungefähr länglich eiförmig, abgestutzt, an der Unterseite ausgehöhlt, hellgrün, c. 0.46 – 0.5 cm lang, 0.2 – 0.3 cm breit, 1blättrig. Blatt dick fleischig, linear, auf dem Querschnitt ungefähr oval, stumpf-

winkelig rinnig, mit einem Spitzchen, am Grunde kurz stielförmig zusammengezogen, hellgrün, c. 2—3.2 cm. lang, 0.3—0.4 cm breit. Blütenstände an den Knoten des Rhizoms, meistens gezweit, sehr kurz, 1blütig; Pedunculus dem Rhizom angedrückt, c. 0.23 cm lang, mit c. 2 Schaftblättern. Braktee röhrig, dreieckig verlängert, länger als das Ovarium. Blüte klein, gelblichweiss, c. 0.65 cm lang. Sepalen zusammenneigend, aus dreieckiger, konkaver Basis lang pfriemlich zugespitzt, 0.6—0.65 cm lang. Petalen klein, rautenförmig, stumpf, c. 0.15 cm lang. Lippe klein, beweglich, eiförmig dreieckig, konkav, gelblichweiss, an der Basis hellzitronengelb, 0.14 cm lang. Säule sehr kurz, weiss, mit dreieckigen Öhrchen. Anthere ungefähr rund, an der Spitze abgestutzt. Pollinien von der Seite zusammengedrückt, ungefähr halbrund, gelblich. Narbe gross, fast rund. Säulenfuss mit dem Ovarium einen stumpfen Winkel bildend, kurz, länglich, abgestutzt, gelblich, 0.05 cm lang. Ovarium sitzend, verkehrt kegelig, 6furchig, gelblich, 0.06 cm lang.

*__Bulbophyllum peperomiifolium__ J.J.S. n.sp.

Rhizoma elongatum, repens, filiforme, ad nodos radicans, fuscescens c. 0.07 cm. diam., initio vaginis brevibus tubulosis quam internodia brevioribus tectum. Pseudobulbi c. 1.5—2.3 cm. dissiti, maxime reducti, 1folii. Folium parvum, ellipticum, breviter subacutum, basi obtusum, crasse carnosum, supra subtusque convexum, supra cum canalicula longitudinali, praesertim subtus impresse rugulosum, utrinque furfuraceo-punctatum, nitidum, dilutius viride, margine prasertim basin versus violaceo-suffusum, subtus violaceo-punctatum, c. 0.7—0.95 cm. longum, 0.45—0.6 latum; pedicellus brevissimus, a dorso compressus, sectione transversa ovalis, supra sulcatus, transverse rugulosus, purpureo-suffusus, c. 0.03-0.07 cm. longus. Inflorescentiae e nodis rhizomatis, solitariae, adscendentes, folia superantes, 2florae, pedunculo filiformi, purpureo-suffuso, c. 1.5—1.6 cm. longo, vaginulis c. 5 tubulosis acutis inferioribus approximatis donato, rachide filiformi, c. 0.23 cm. longa. Bracteae adpressae, oblongae, acuminatae, concavae, purpureo-suffusae, c. 0.23 cm. longae. Flores parvuli, teneri, pallide flavescentes, c. 0.7 cm. longi et lati. Sepalum dorsale horizontale, oblongo-triangulum vel melius quinquangulare, superne sensim angustatum, acutum, concavum, bene 0.7 cm. longum,

0.24 cm. latum. Sepala lateralia porrecta, divergentia, oblique oblongo-triangula, sensim angustata, acuta, leviter concava, c. 0.73 cm. longa, 0.275 cm. lata. Petala gynostemio parallela, porrecta, parva, oblonga, obtusa, concava, c. 0.26 cm. longa, 0.1 cm. lata. Labellum mobile, in $^1/_3$ supra basin recurvulum, oblongum, obtusum, inferne canaliculatum, canalicula usque ad $^1/_3$ partem infra apicem producta, marginibus recurvis, parte superiore convexum, inexplanatum c. 0.325 cm. longum, 0.16 cm. latum. Gynostemium crassiusculum, leviter a latere compressum, margine in utraque stigmatis parte late rotundato-triangulo-dilatatum, c. 0.13 cm. longum, apice breviter triangulo cum denticulo utrinque, auriculis brevibus, triangulis. Anthera cucullata, suborbicularis, alba, c. 0.05 cm. lata. Pollinia in corpusculum subglobosum unita, flava, c. 0.03 cm. longa, cum materia glutinosa. Rostellum late triangulum, leviter acuminatum, supra convexum, subtus concavum. Stigma minusculum, alte excavatum. Pes gynostemii cum ovario angulum acutum faciens, paulum ultra medium rectangule incurvus, late linearis, apice a sepalis lateralibus liber, truncatus, concavus, inexplanatus c. 0.2 cm. longus. Ovarium obconicum, apice valde obliquum, 6sulcatum, pallide flavescens, praesertim in sulcis dilute fusce furfuraceo-punctatum, c. 0.15 cm. longum; pedicellus tenuis, cum ovario angulum obtusum faciens, albidus, inferne pallide purpureo-suffusus, c. 0.4 cm. longus.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber, in c. 1000 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im April 1917).

Diese sehr charakteristische, wie es scheint sehr seltene Art wäre vorläufig vielleicht am besten in die Sektion *Aphanobulbum* einzureichen, wiewohl die kleinen, sehr dicken Blätter der Pflanze ein ganz besonderes Aussehen verleihen.

Bulbophyllum peperomiifolium J. J. S.

Rhizom verlängert, kriechend, fadenförmig, an den Knoten wurzelnd, bräunlich, c. 0.07 cm im Durchmesser, anfangs mit kurzen, röhrigen Scheiden. Trugknollen c. 1.5—2.3 cm auseinander, äusserst klein, 1blättrig. Blatt klein, elliptisch, kurz spitzlich, mit stumpfer Basis, dickfleischig, oben und unten konvex, oben mit einer Längs-

rinne, besonders unten runzelig, beiderseits kleiig punktiert, glänzend, ziemlich hellgrün, am Rande besonders gegen die Basis violett überlaufen, unten violett punktiert, c. 0.7—0.95 cm lang, 0.45—0.6 cm breit; Stielchen sehr kurz, querrunzelig, 0.03—0.07 cm lang. Blütenstände an den Knoten des Rhizoms, die Blätter überragend, 2blütig; Pedunculus fadenförmig, purpurn überlaufen, c. 1.5—1.6 cm lang, mit c. 5 röhrigen, spitzen Schaftblättern; Rachis fadenförmig, c. 0.23 cm lang. Brakteen anliegend, länglich, zugespitzt, konkav, c. 0.23 cm lang. Blüten klein, zart, blassgelblich, c. 0.7 cm lang und breit. Sepalen länglich dreieckig, spitz, c. 0.7 und 0.73 cm lang, 0.24 und 0.275 cm breit. Petalen klein, parallel, länglich, stumpf, konkav, 0.26 cm lang, 0.1 cm breit. Lippe beweglich, stumpf, der untere Teil rinnig, der vordere Teil konvex, unausgespreizt c. 0.325 cm lang. Säule ziemlich dick, mit beiderseits breit dreieckig verbreitertem Rande, c. 0.13 cm lang, beiderseits der Spitze mit einem Zähnchen, die Öhrchen kurz, dreieckig. Anthere nahezu rund, weiss, c. 0.05 cm breit. Pollinien zu einem nahezu kugeligen Körperchen vereinigt, gelb. Narbe klein, tief ausgehöhlt. Säulenfuss mit dem Ovarium einen spitzen Winkel darstellend, etwas über der Mitte rechtwinkelig eingebogen, breit linear, der obere Teil frei, abgestutzt, unausgespreizt c. 0.2 cm. lang. Ovarium verkehrt kegelig, an der Spitze sehr schief, 6furchig, gelblich, besonders in den Furchen kleiig punktiert, c. 0.15 cm lang; Stielchen dünn, c. 0.4 cm lang.

Bulbophyllum distans J. J. S. n. sp.

Rhizoma elongatum, repens, teres, ad nodos paucas radices emittens, vaginis tubulosis, adpressis, internodiis aequilongis vel brevioribus, internodiis c. 0.8—1 cm. longis. Pseudobulbi c. 6.5—11.5 cm. dissiti, parvi, depressi, disciformes, 1folii. Folium erectum, petiolatum, ovatum, apice recurvum conduplicatumque, obtusum, basi truncato-rotundatum, costa media subtus in sicco prominente, carnosum, c. 4—5.8 cm. longum, 1.8—2.7 cm. latum; petiolus canaliculatus, c. 0.9—1.5 cm. longus. Inflorescetiae ad basin pseudobulborum, laxe multiflorae, pedunculo c. 3.25—4 cm. longo, vaginulis c. 5—6 tubulosis carinatis in spiritu vini minute puncticulatis donato, vaginulis inferioribus approximatis, sese amplectentibus, truncatis, superioribus accrescentibus, magis remotis, breviter acuminatis, acutis, ad c. 1.1 cm. longis, rachide tenui,

angulata, c. 5.5 — 6.5 cm. longa. Bracteae lanceolatae, acutissimae, concavae, 1nerviae, c. 0.66 cm. longae, 0.17 cm. latae. Flores parvi. Sepalum dorsale horizontale, subtriangulo oblongum, breviuscule acuminatum, valde concavum, 3nervium, c.0.36 cm. longum, 0.16 cm. latum. Sepala lateralia porrecta, divergentia, oblongo-triangula, sensim subulato-acuminata, valde concava, dorso carinata, 3nervia, bene 0.4 cm. longa, 0.16 cm. lata. Petala oblongo-elliptica, obtusiuscula, minute apiculata, 1nervia, c. 0.16 cm. longa, 0.06 cm. lata. Labellum leviter curvatum, canaliculatum cum apice lateribusque supra convexis, marginibus in c. $^1/_3$ supra basin recurvis, basi excepta papillosum, 3nervium, explanatum ovatum, obtusum, c. 0.17 cm. longum, 0.12cm. latum. Gynostemium cum anthera c. 0.075 cm. longum, apice lato, subexciso-truncato, clinandrio concavo, auriculis anthera bene brevioribus, porrectis, triangulis, acutis, margine inferiore obtusangule dilatatis. Anthera cucullata. Stigma majusculum, profunde excavatum, angulato-orbiculare, margine inferiore elevatulum. Pes gynostemii cum ovario angulum obtusum faciens, leviter incurvulus, oblongus, obtusus, convexus, ecallosus, c. 0.08 cm. longus. Ovarium pedicellatum crassiusculum, c. 0.25 cm. longum.

Java: Auf dem Wilis am Osthang in c. 1650 m ü. d. M., im lockeren Walde. (J. A. Lörzing n. 955, bl. im Februar 1914).

Unter den javanischen Arten sieht diese *B. petiolatum* J. J. S. am ähnlichsten; sie ist jedoch eine viel weiter hinkriechende Art mit kürzeren Blättern, viel kleineren, anders gefärbten, weisslichen Blüten und einem nicht mit einer Schwiele versehenen Säulenfuss.

Beschreibung nach Herbar und einem in Alkohol aufbewahrten Blütenstand.

Bulbophyllum distans J. J. S.

Rhizom verlängert, kriechend, stielrund, an den Knoten einige Wurzeln treibend, mit röhrigen, anliegenden, den Internodien gleich langen oder kürzeren Scheiden; die Internodien c. 0.8 — 1 cm lang. Trugknollen c. 6.5 — 11.5 cm auseinander gestellt, klein, niedergedrückt, scheibenförmig, 1blättrig. Blatt aufrecht, gestielt, eirund, mit zurückgebogener, rinniger, stumpfer

Spitze, an der Basis abgestutzt abgerundet, mit in sicco unten vorragender Mittelrippe, fleischig, c. 4 – 5.8 cm lang, 1.8 – 2.7 cm breit; Stiel rinnig, c. 0.9 – 1.5 cm lang. Blütenstände am Grunde der Trugknollen, locker vielblütig; Pedunculus c. 3.25 – 4 cm lang, mit c. 5 – 6 röhrigen, gekielten, in Alkohol fein punktierten Schaftblättern, die unteren dicht beisammen, einander umfassend, abgestutzt, die höheren lockerer gestellt und grösser werdend, kurz zugespitzt, spitz, bis c. 1.1 cm lang; Rachis, dünn, kantig, c. 5.5 - 6.5 cm lang. Brakteen lanzettlich, sehr spitz, konkav, 1nervig, c. 0.66 cm lang, 0.17 cm breit. Blüten klein. Unpaares Sepalum horizontal, länglich, etwas dreieckig, kurz zugespitzt, sehr konkav, 3nervig, c. 0.36 cm lang, 0.16 cm breit. Paarige Sepalen vorgestreckt, divergierend, länglich dreieckig, allmählich pfriemlich zugespitzt, sehr konkav, aussen gekielt 3nervig, gut 0.4 cm lang, 0.16 cm breit. Petalen länglich elliptisch, ziemlich stumpf, mit einem kleinen Spitzchen, 1nervig, c. 0.16 cm lang, 0.06 cm breit. Lippe schwach gebogen, rinnig mit sehr konvexen Seiten und Spitze, die Ränder in c. $^1/_3$ über der Basis zurückgebogen, ausser am Grunde papillös, 3nervig, ausgespreizt eirund, stumpf, c. 0.17 cm lang, 0.12 cm breit. Säule mit der Anthere c. 0.075 cm lang, mit breiter, abgestutzter, etwas ausgeschnittener Spitze; Clinandrium konkav; Öhrchen viel kürzer als die Anthere, vorgestrekt, dreieckig, spitz, am Unterrande stumpfwinkelig verbreitert. Anthere kappig. Narbe gross, tief, eckig rund, mit erhabenem Unterrande. Säulenfuss mit dem Früchtknoten einen stumpfen Winkel bildend, schwach eigebogen, länglich, stumpf, konvex, ohne Verdickung, c. 0.08 cm lang. Fruchknoten mit dem Stielchen c. 0.25 cm lang, ziemlich dick.

***Bulbophyllum obtusipetalum** J. J. S. in Fl. Buit. VI, Orch. (1905), 424; Atl. fig. CCCXIX.

Rhizoma repens, ramosum, teres, pallide fuscescens, ad c. 0.5 cm. diam., initio vaginis conspicuis tubulosis tectum, vaginis ultimis (sub pseudobulbis) maximis, lateraliter compressis, superne ampliatis, breviter acutis, carinatis, ad c. 6 cm. et plus longis, radicibus tenuibus. Pseudobulbi c. 2 — 4 cm. dissiti, minimi, depresse disciformes, c. 0.15 cm. alti, 0.4 cm. diam., 1folii. Folium erectum, petiolatum, lanceolatum, obtusum, basi sensim in petiolum angus-

tatum, costa media supra canaliculata subtus obtuse prominente, coriaceum, utrinque nitide viride, c. 15—24 cm. longum, 2.8—4.5 cm. latum; petiolus canaliculatus, basi teres, c. 7—10 cm. longus. Inflorescentiae 2 ad basin pseudobulborum novellorum sed maturorum erectae, foliis breviores, laxe multiflorae, pedunculo pallide viridi, c. 8—11.5 cm. longo, pluribus (c.6) vaginulis superne magis remotis tubulosis apicem versus paulo ampliatis et antice fissis carinatis pallidis inferioribus brevissimis obtusisque summis maximis acutis ad c. 1.5—2 cm. longis donato, rachide angulata, pallide viridi, c. 11—15 cm. longa. Bracteae patentes, oblongo-triangulae, acute acuminatae, concavae, pallide virides, ad c. 0.45—0.7 cm. longae. Flores quaquaversi, carnosuli, pallide flavescentes, suaveolentes, sepalis usque ad medium arcte contiguis, apice recurvulis. Sepalum dorsale quam lateralia brevius, oblongo-lanceolatum, acute conico-acuminatum, valde concavum, margine superne papillosum, 3nervium, c. 0.7—0.75 cm. longum, 0.22 cm. latum. Sepala lateralia mentum brevissimum obtusum formantia, sigmoidea, oblongo-triangula, compresse conico-acuminata, valde concava, 3nervia, c. 0.7 cm. longa, 0.3 cm. lata. Petala parva, parallela, oblonga, obtusa, convexa, marginibus recurva, apice papillosa, 1nervia, c. 0.2—0.22 cm. longa, 0.1 cm. lata. Labellum mobile, curvatum, inferne marginibus erectis alte canaliculato-concavum, ambitu oblongum, apice angustatum, obtusum, margine papilloso-ciliolatum, costis 2 longitudinalibus validis in flexu altissimis superne decrescentibus et dilatatis, apice costula tertia minima interposita, subtus in flexu alato-carinatum, 3nervium, flavum, inexplanatum c. 0.275—0.3 cm. longum. Gynostemium breve, dorso convexum, c. 0.1 cm. longum, apice lato obtusissimo, auriculis porrectis, antheram paulo superantibus, lineari-subulatis, basi antice dilatatis. Anthera cucullata, obtusissima, connectivo leviter incrassato, c. 0.06 cm. longa. Pollinia 2 (?), extus convexa. Stigma majusculum, obovatum. Pes gynostemii cum ovario angulum obtusum faciens, incurvulus, linearis, obtusus, dimidio inferiore costa longitudinali in dentem angustum cum pede angulum acutum facientem acutum vel acutiusculum terminante instructus, c. 0.175 cm. longus. Ovarium pedicellatum clavatum, 6sulcatum, c. 0.3 cm. longum.

Java: Priangan, auf dem Gede. (H. Hallier n. 506, bl. im

August 1894 ?). Goenoeng Andoeng, westlich vom Merbaboe, in 1600 m ü. d. M.; allgemein. (W. Docters van Leeuwen n. 280, bl. im Oktober 1911). Tjadas Malang bei Tjibeber in c. 1000 m ü. d. m. (W. F. Winckel, bl. im Oktober und November 1916, kult. unter n. 253).

Durch besseres Material bin ich jetzt in der Lage eine ausführliche Beschreibung zu geben.

B. subclausum J. J. S. von Sumatra ist nahe verwandt.

***Bulbophyllum cornutum** Rchb. f. in Walp. Ann. VI (1861), 247; J. J. S. in Fl. Buit. VI, Orch. (1905), 444.— *Ephippium cornutum* Bl. Bijdr. (1825), 310; Tab. f. 65; Lndl. Gen. et sp. Orch. (1833), 232; Miq. Fl. Ind. Bat. III (1855). 689.—*Phyllorchis cornuta* O. K. Rev. gen. pl. II (1895), 676.

Rhizoma repens, radicans, teres, viride, deinde suberinum, c. 0.3—0.5 cm. diam., vaginis tubulosis carinatis apiculatis internodiis brevioribus superne accrescentibus pallidis sordide punctatis initio tectum. Pseudobulbi c. 1.6—4 cm. dissiti, oblique ovoidei, obtusi, subangulati, virides, c. 1.8—3.8 cm. alti, 1.45—2.1 cm. diam., 1folii. Folium lanceolatum, apice recurvulo acutum, basi sensim subpetiolato-angustatum, costa media supra sulcata subtus prominente, coriaceum, supra nitidule atroviride, subtus subopacum et costa media excepta pallidius, novellum subtus sordide punctatum, c. 13—20 cm. longum, petiolo canaliculato-conduplicato c. 1.2—2.5 cm. longo, 2.1—3.1 cm. latum. Inflorescentiae ad basin pseudobulborum et e nodis rhizomatis, adscendentes, breves, 1florae, pedunculo pallide viridi, furfuraceo-punctato, c. 1.6—1.8 cm. longo, nonnullis vaginulis superioribus accrescentibus tubulosis superne ampliatis breviter acuminatis apice incurvulis semipellucidis flavescentibus intus violaceo-punctatis utrinque furfuraceo-punctatis carina dilute virescentibus ad c. 0.9 cm. longis donato. Bractea rachidem semiamplectens, late ovato-triangula, subulato-acuminata, apice incurva, concava, costa media dorso carinata, colore vaginularum, c. 0.9 cm. longa. Flos mediocris, aromaticus, c. 2.9 cm. latus, sepalis petalisque argillaceo-ochraceis, intus nitidis, extus nitidulis. Sepalum dorsale erectum, vix ovato-oblongum, acutum, dorso lateraliter compresso-apiculatum, basi truncata medio tantum insertum, concavum, basi marginibusque

convexum, costa media dorso leviter incrassata, dense atroviolaceo-maculatum, c. 1.75 cm. longum, 0.8 cm. latum. Sepala lateralia a sepalo intermedio valde remote inserta, patentissima, marginibus proximis inferne incurvis contigua, concava, late oblique ovato-triangula, margine postico valde rotundata, obtusa, brevissime et lateraliter compresso-apiculata, costa media dorso versus apicem incrassata, dense medio confluenter atroviolaceo-maculata, c. 1.6 cm. longa, basi 0.7 cm., supra basin 1.25 cm. lata. Petala divaricata, oblique elliptico-oblonga, acuta, breviter lateraliter compresso-apiculata, medio concavula, ceterum leviter convexa, atroviolaceo-maculata, c. 1.4 cm. longa, bene 0.6 cm. lata. Labellum membrana pedi gynostemii insertum, valde mobile, carnosum, curvatum, ambitu late cordato-ovatum, subtrilobum, inferne longitudinaliter sulcatum cum incrassatione longitudinali convexa utrinque, lobis lateralibus patentibus late rotundatis breviter fimbriatis, lobo intermedio late triangulo superne recurvo et lateraliter compresso obtuso, subtus longitudinaliter sulcatum, opacum, atroviolaceum, c. 0.8 cm. longum, 0.7 cm. latum. Gynostemium breve, crassum, dorso convexum, apice oblique truncatum, nitidum, albidum, atropurpureo-punctatum, absque anthera c. 0.3 cm. longum, clinandrio obliquo, leviter concavo, auriculis triangulis, obtusis, stelidiis 2 magnis, dependentibus, parallelis, linearibus, apice valde hamato recurvis, obtusis, intus convexis, extus leviter concavis, sordide albidis, atropurpureo-punctatis, c. 0.28 cm. longis. Anthera cucullata, transverse ovali-reniformis, apice breviter triangulo-producta et incurva, explanata c. 0.2 cm. lata, connectivo carinato-elevato. Pollinia 4, lateraliter compressa, inaequalia, oblique suborbicularia, exteriora extus convexa, interiora minora et multo tenuiora, flava, glandula spuria magna, obverse claviformi, nitida, aurantiaca, tota c. 0.225 cm. longa. Rostellum rotundatum. Stigma majusculum, alte excavatum, transverse subsexangulato-ovale, purpureo-punctatum. Pes gynostemii cum ovario angulum subrectum faciens, linearis, $^2/_5$ partibus superioribus a sepalis liber et hamato incurvus, apicem versus vix angustatus, pallide ochrascens, atropurpureo-punctatus, inexplanatus c. 0.8 cm. longus. Ovarium pedicellatum 6angulatum, superne 6alatum et incrassatum, pallide viridi-flavescens, apicem versus dilute viride, minute fusce furfuraceo-punctatum, c. 3.3 cm. longum.

Java: Buitenzorg, auf dem Salak (Blume). Priangan, Tjadas Malang und Tjisokan bei Tjibeber in c. 1000 m ü.d.M. (W. F. Winckel, kult. unter n. 236, nahezu das ganze Jahr blühend).

Diese Art ist schliesslich nach mehr als 90 Jahren wieder zurückgefunden, und zwar in der Umgebung von Tjidadap bei Tjibeber.

* **Bulbophyllum Winckelii** J. J. S. n. sp.

Rhizoma repens, teres, c. 0.3 — 0.325 cm. diam., initio vaginis tubulosis tectum, radicibus apice aurantiacis. Pseudobulbi c. 2.5 — 4 cm. distantes, erecti, cum rhizomate angulum acutum facientes, subovoideo-oblongi, antice longitudinaliter bicanaliculati, subflavescenti-virides, c. 3 — 4.2 cm. longi, 0.95 — 1.15 cm. diam., 1folii, novelli vaginis inclusi. Folium erectum, lanceolatum, apice recurvum, obtusum, basi petiolato-contractum, supra obtusangule canaliculatum cum lateribus leviter convexis, costa media supra sulcata subtus carinata, tenuiter et molliter coriaceum, supra nitide viride, subtus pallidius et opacum, totum c. 17 — 18 cm. longum, 2.85 — 3 cm. latum, petiolo conduplicato, c. 1.5 — 2 cm. longo. Inflorescentiae e nodis rhizomatis, folio multo breviores, 1florae, pedunculo pallide viridi, furfuraceo-punctato, c. 2 — 4 cm. longo, vaginulis c. 3 — 5 superioribus accrescentibus tubulosis superne ampliatis ochrascentibus ad c. 1.8 cm. longis donato. Bractea erecto-patens, cymbiformi-conduplicata, curvata, elliptica, acuta, valde carinata, ochrascens, parce furfuraceo-punctata, c. 1.3 — 2.1 cm. longa. Flos majusculus, virescenti-flavus, odorem aromaticum exhalens, c. 4 — 4.5 cm. latus. Sepalum dorsale basi medio tantum insertum et utrinque subrectangulatum, incurvum, oblongo-ovatum, acutum, apiculatum, obtusangule concavum, dorso acute carinatum, nervis c. 9 intus praesertim basin versus prominulis, utrinque nitidulum, basi intus nitidum, dorso minutissime fusce punctatum, c. 2.5 — 3 cm. longum, 0.95 — 1.1 cm. latum. Sepala lateralia a sepalo intermedio remote inserta, divergentia, oblongo-triangula, falcata, breviter apiculato-acuminata, margine exteriore supra basin angulum obtusum formantia, margine interiore erosula et basi minute undulata, leviter concava, margine exteriore recurva et convexa, dorso apicem versus carinata, c. 9nervia, utrinque nitida, dorso minutissime fusce furfuraceo-punctata, c. 2.2—2.6 cm. longa, supra basin 0.9—1.1 cm. lata. Petala patentissima, oblique elliptico-oblonga, subfalcata, leviter acuminata, acuta, nervis c. 7 intus prominulis, intus opaca, punctis nitidis conspersa, basi nitida, c. 1.95—2.6 cm. longa, 0.73—0.97 cm. lata. Labellum parvum, mobile, leviter curvatum, a dorso compressum, latum, ambitu subobovato-quadrangulum, marginibus lateralibus leviter incurvulum et minutissime serrulatum, apice abrupte et breviter recurvum cum sulco longitudinali, late rotundatum, dimidio inferiore late obtusangule canaliculatum, canalicula incrassationibus conspicuis basi divergentibus in medio labelli Λformiter conjunctis convexis dense puberulis limitata, parte antica margine excepto convexum et subrugulosum, subtus convexum cum sulco longitudinali, basin versus in utraque sulci parte puberulum, aureum, c. 0.55–0.65 cm. longum, 0.45–0.6 cm. latum. Gynostemium crassum, dorso convexum, opacum, pallide flavescens, c. 0.57 cm. longum, clinandrio obliquo, concavo, filamento tenui, lineari, auriculis brevissimis, latis, brevissime 2dentatis, stelidiis conspicuis, deorsum spectantibus, incurvis, subulatis, anguste obtusis, interne infra apicem dente obtuso instructis, nitidulis, c. 0.26 cm. longis. Anthera cucullata, oblique conica, apice truncata et minute serrulata, connectivo convexo-incrassato et verruculoso-papilloso, aurea, postice albida, c. 0.175 cm. lata. Pollinia 4, corpusculum subglobosum formantia, flava, exteriora extus convexa, interiora multo minora et tenuiora, glandula spuria majuscula curvata flava munita, tota c. 0.225 cm. longa. Stigma magnum, transverse sexangulatum. Pes gynostemii cum ovario angulum obtusum faciens, subundatus, linearis, basin versus sensim dilatatus, apice liber et subrectangule incurvus, in dentes 2 parvos porrectos parallelos triangulos obtusos lateraliter compressos exeuns, intus convexus, c. 0.725—0.8 cm. longus. Ovarium valde alato-sexangulatum, dilute viride, minute fusce furfuraceo-punctatum, c. 0.7—0.8 cm. longum; pedicellus 6angulatus, pallide viridis, furfuraceo-punctatus, c. 3—3.75 cm. longus.

Java: Priangan, Tjisokan bei Tjibeber, in c. 750 m ü. d. M. (W. F. Winckel, bl. im Oktober 1916 und März 1917, kult. unter in 247). Tjadas Malang, in 1000 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im Mai 1917). Goenoeng Beser, in c.

1200 m ü d. M. (R. C. Bakhuizen van den Brink, bl. im April 1917).

Diese Art gehört zu den näheren Verwandten des *B. cornutum* Rchb. f., von dem sie übrigens in allen Teilen verschieden ist.

Bulbophyllum Winckelii J. J. S.

Rhizom kriechend, stielrund, mit an der Spitze orangefarbigen Wurzeln. Trugknollen c. 2.5 — 4 cm auseinander gestellt, eiförmig länglich, gelblichgrün, c. 3 — 4.2 cm lang, 0.95 — 1.15 cm dick. Blatt lanzettlich, an der Spitze zurückgebogen, stumpf, am Grunde stielförmig zusammengezogen, unten gekielt, glänzend grün, unten matt und heller, c. 17 — 18 cm lang, 2.85 — 3 cm breit. Blütenstände an den Knoten des Rhizoms, kurz, 1blütig; Pedunculus blassgrün, c. 2 — 4 cm lang, mit 3 — 5 nach oben grösser werdenden, röhrigen, oben erweiterten, gekielten, ockergelblichen, bis 1.8 cm langen Schaftblättern. Braktee kahnförmig zusammengelegt, elliptisch, spitz, gekielt, gelblich, c. 1.3 — 2.1 cm lang. Blüte ziemlich gross, grünlichgelb, später gelb, aromatisch riechend, 4 — 4.5 cm. breit. Unpaares Sepalum länglich eirund, spitz, mit einem Spitzchen, nur in der Mitte der Basis inseriert, konkav, aussen gekielt, mit c. 9 innen schwach vorragenden Nerven, c. 2.5 — 3 cm lang, 0.95 — 1.1 cm breit. Paarige Sepalen länglich dreieckig, sichelig, mit einem Spitzchen, aussen gegen die Spitze gekielt, c. 2.2 — 2.6 cm lang, 0.9 — 1.1 cm breit. Petalen schief länglich elliptisch, schwach zugespitzt, c. 7nervig, c. 1.95 — 2.6 cm. lang, 0.73 — 0.97 cm breit. Lippe beweglich, schwach gebogen, vom Rücken zusammengedrückt, im Umriss ungefähr verkehrt eirund viereckig, an der Spitze breit abgerundet, die untere Hälfte mit einer breiten, von verdickten, gegen die Basis divergierenden, konvexen, kurz behaarten Rändern begrenzten Längsrinne, vorn konvex und schwach runzelig, unten mit einer Längsfurche und gegen die Basis behaart, goldgelb, c. 0.55 — 0.65 cm lang, 0.45 — 0.6 cm breit. Säule dick, matt blassgelblich, c. 0.57 cm lang, mit 2 ansehnlichen, leicht gekrümmten, pfriemlichen Stelidien. Anthere kegelig, an der Spitze abgestutzt und klein gezähnelt. Pollinien 4, ungefähr rund, die 2 inneren sehr dünn und klein, mit einer Scheinklebmasse. Narbe gross. Säulenfuss mit dem Ovarium einen stumpfen Winkel bildend, mit freier, eingebogener Spitze, linear, an der Spitze beiderseits mit einem kleinen Zahn, 0.725 — 0.8

cm lang. Ovarium stark 6rippig, 0.7—0.8 cm lang; Stielchen 3—3.75 cm lang.

Bulbophyllum hamatipes J. J. S. n. sp.

Rhizoma repens, ramosum, teres, radicibus crassis. Pseudobulbi c. 1—1.5 cm. distantes, ovoidei, c. 1.1—1.4 cm. longi, 1folii. Folium erectum, lanceolatum, apice breviter conduplicatum, acutum, basi petiolato-contractum, margine sicco recurvum, costa media supra sulcata subtus carinata, sicco papyraceo-coriaceum, totum c. 5—7.5 cm. longum, 0.93—1.4 cm. latum, petiolo conduplicato-canaliculato, c. 0.6—0.8 cm. longo. Inflorescentiae e nodis rhizomatis, folio breviores, 1florae, pedunculo c. 2 cm. longo, nonnullis vaginulis tubulosis acuminatis ad c. 0.8 cm. longis donato. Bractea oblonga, concava, sicco c. 0.7—0.8 cm. longa. Flos mediocris, sepalis dorso minute furfuraceo-punctatis. Sepalum dorsale oblongum, apice angustatum, subapiculato-acutum, concavum, dorso subcarinatum, c. 7nervium, carnosulum, c. 1.65 cm. longum, 0.57 cm. latum. Sepala lateralia a sepalo dorsali remote inserta, oblongo-ovata, falcata, apice conduplicato-acuta, margine interiore irregulariter marginata et infra medium angulum formantia, concava, c. 7nervia, c. 1.5 cm. longa, 0.65 cm. lata. Petala oblique oblonga, acuta, c. 7nervia, nervis exterioribus brevibus, c. 1.3 cm. longa, bene 0.5 cm. lata. Labellum mobile, supra basin et infra apicem recurvum, carnosum, ambitu oblongum, supra convexum, marginibus utrinque prominentibus basin versus irregularibus, basi marginibus erectis rotundatis biauriculatum, supra usque ad apicem canaliculatum, canalicula basi dilatata fere usque ad medium costis inferne papillosis convexis basi divergentibus et in auriculas excurrentibus limitata, subtus lateraliter compressum convexum et basi tantum sulco longitudinali instructum, c. 0.55 cm. longum, 0.35 cm. latum. Gynostemium brevissimum, stelidiis linearibus, paulo compressis, apice vix dilatatis, obtusis, edentiferis, c. 0.1 cm. longis. Anthera cucullata, oblique semiglobosa, apice truncata, connectivo valde convexo-incrassato antice altiore obtuso minute papilloso, c. 0.2 cm. longa. Pes gynostemii apice liber et rectangule incurvus, linearis, apice obtusus et antice minute bilobus, intus convexus, c. 0.4 cm. longus. Ovarium pedicellatum c. 3.5 cm. longum, praesertim superne 6costatum, parce furfuraceo punctatum.

Java: Bandoeng, Tjibeureum bei Tjinjiroean, in c. 1600 m ü. d. M. (A. Rant, bl. im Juli 1915).

Die Art ist in vieler Hinsicht *B. Winckelii* J. J. S. ähnlich und besitzt nach dem Sammler ebenfalls gelbe Blüten. Sie ist jedoch in allen Teilen bedeutend kleiner und hat eine schmälere Lippe.

Nach dem vorliegenden Material scheint es nicht gut möglich sie als eine Varietät des *B. Winckelii* anzusehen.

Beschreibung nach getrocknetem Material.

Bulbophyllum hamatipes J. J. S.

Rhizom kriechend, verzweigt, stielrund, mit dicken Wurzeln. Trugknollen c. 1.1—1.5 cm lang, 1blättrig. Blatt lanzettlich, spitz, am Grunde stielförmig zusammengezogen, mit oben rinniger, unten gekielter Mittelrippe, trocken papierartig ledrig, im ganzen 5—7.5 cm lang, 0.93—1.4 cm breit, der Stiel rinnig, 0.6—0.8 cm lang. Blütenstände an den Knoten des Rhizoms, kürzer als die Blätter, 1blütig; Pedunculus c. 2 cm lang, mit einigen röhrigen, zugespitzten, bis c. 0.8 cm langen Schaftblättern. Braktee länglich, konkav, sicco 0.7—0.8 cm lang. Blüte mittelgross, mit aussen fein kleiig punktierten Sepalen. Unpaares Sepalum länglich, spitz, konkav, fast gekielt, c. 1.65 cm lang, 0.57 cm breit. Paarige Sepalen weit vom unpaaren inseriert, länglich eiförmig, sichelig, spitz, die einander zugewandten Ränder unregelmässig berandet, konkav, c. 1.5 cm lang, 0.65 cm breit. Petalen schief länglich, spitz, c. 1.3 cm lang, 0.5 cm breit. Lippe beweglich, über der Basis und unterhalb der Spitze umgebogen, im Umriss länglich, fleischig, am Grunde durch die aufrechten Ränder abgerundet 2öhrig, weiter konvex und mit einer bis zur Spitze fortlaufenden, bis zur Mitte von 2 konvexen, nach unten papillösen, divergierenden und auf die Öhrchen auslaufenden Rippen begrenzten Längsrinne, die Ränder gegen die Basis unregelmässig, unten konvex, und nur an der Basis mit einer Längsrinne, c. 0.55 cm lang, 0.35 cm breit. Säule sehr kurz, mit 2 linearen, stumpfen, ungezähnten, c. 0.1 cm langen Stelidien. Anthere schief halbkugelig, an der Spitze abgestutzt, mit stark verdicktem, gegen die Spitze erhöhtem, stumpfem, kleinpapillösem Konnektiv. Säulenfuss linear, an der Spitze frei, rechtwinkelig

eingebogen und mit 2 kleinen Läppchen, c. 0.4 cm lang. Ovarium mit dem Stielchen c. 3.5 cm lang, besonders nach oben 6rippig, etwas kleiig punktiert.

***Bulbophyllum submarmoratum** J. J. S. n. sp.

Pseudobulbi approximati, oblique ovoideo-globosi ad ovoidei, obtusi, dilute virides, c. 0.4—0.65 cm. diam., 1folii, fibris vaginarum mox fatiscentium cincti. Folium lanceolatum, apice brevissime recurvo subacutum vel subobtusum, basi sensim in petiolum angustatum, supra in utraque parte costae mediae supra sulcatae subtus haud vel vix incrassatae leviter convexum, nitidule viride, subtus opacum et paulo pallidius, c. 5—17 cm. longum, 1.2—2.2 cm. latum; petiolus conduplicato-canaliculatus, c. 1.5—5 cm. longus. Inflorescentiae e basi pseudobulborum, adscendentes, apice spicam nutantem densam cylindricam pluri- ad multifloram gerens, pedunculo tenui, tereti, pallido, densissime longitudinaliter purpureo-striolato, nonnullis vaginulis tubulosis superne ampliatis acuminatis carinatis pallidis ad c. 0.425 cm. longis donato, c. 5.5—15 cm. longo, rachide paulo crassiore, angulata, viridi, purpureo-tincta, c. 0.8—3.5 cm. longa. Bracteae persistentes, ovario adpressae, oblongo-triangulae, acutissimae, concavae, pallide virides, plus minusve purpureo-punctatae, ad c. 0.2 cm. longae. Flores parvi, quaquaversi, sessiles, patentes, imbricantes, carnosuli, c. 0.35—0.4 cm. longi, sepalis petalisque subparallelis, pallide viridibus, purpureo-punctatis. Sepalum dorsale late ovato- ad oblongo-triangulum, obtusum vel subobtusum, apice plerumque recurvum, concavum, c. 0.25—0.3 cm. longum, 0.15—0.25 cm. latum. Sepala lateralia porrecta, oblique triangula, subfalcatula, brevissime acuminata vel acuta, papillosa, c. 0.275—0.3 cm. longa, c. 0.175 cm. lata. Petala oblique subovato-oblonga ad lanceolata, breviter acute acuminata ad acutissime acuminata, superne plus minusve irregulariter marginata, c. 0.17 cm. ad fere 0.25 cm. longa, 0.06—0.08 cm. lata. Labellum mobile, breve, infra medium valde recurvum, parte inferiore alte canaliculato-concavum et subtus convexum, superne valde convexum cum canalicula longitudinali lata marginibus inferne convexo-incrassata, apice rotundatum, marginibus basi excepta valde recurvis et utrinque supra basin lobulum spurium parvum erectum obtusum efformantibus, papillosum, canalicula subpuberulum, pallide flavescenti-

virescens, parte mediana apice excepto atropurpureum, c. 0.1—0.125 cm. longum, c. 0.1 cm. latum. Gynostemium brevissimum, latum, albidum, superne purpureum, c. 0.07 cm. longum, clinandrio concavo, apice obtuso, auriculis antheram superantibus, oblique suboblongis, apice recurvulis, acutis, albidis, margine inferiore dilatatis, extus convexis. Anthera plano-cucullata, transversa, apice obtuse bilobula, albida, medio virescens, c. 0.05—0.06 cm. lata. Pollinia 4, interiora quam exteriora multo minora, semipellucide flava, nitida. Stigma triangulo-suborbiculare, basi breviter in pedem gynostemii decurrens. Pes gynostemii cum ovario angulum obtusum faciens, crassus, albidus, apice purpureus, c. 0.0175 cm. longus. Ovarium sessile, brevissimum, crassum, oblique obconicum, 6sulcatum, purpureum, c. 0.06—0.08 cm. longum. Fructus sessilis, patentissimus, oblique oblongo-ovoideus, obtusus, viridis, purpureo-suffusus, c. 0.9 cm. longus, bene 0.4 cm. diam.

Java: Priangan, Tjadas Malang und Goenoeng Beser bei Tjibeber in c. 1000 m ü.d.M. (W. F. Winckel, bl. im September 1916, kult. in Hort. Winckel unter n. 159). Goenoeng Gombong bei Soekanegara in c. 1000 m ü.d.M. (W. F. Winckel, bl. und fr. im September 1917). Auf dem Slamat. (Früher kultiviert in Hort. Bog.).

Diese Art steht *B. obscurum* J.J.S. am nächsten und ist von ihm zu unterscheiden durch die dünneren, schmäleren, mehr grünen Blätter, punktierten Blüten, anders gestalteten Blütenteile.

Bulbophyllum submarmoratum J. J. S.

Trugknollen genähert, schief eiförmig bis kugelig, hellgrün, c. 0.4—0.9 cm hoch, 0.4—0.65 cm dick, von den Fasern der bald verwitternden Scheiden umgeben. Blatt lanzettlich, mit sehr kurz zurückgebogener, spitzlicher oder stumpflicher Spitze, allmählich stielförmig verschmälert, oben schwach konvex und mit einer Längsfurche, schwach glänzend grün, c. 5—17 cm lang, 1.2—2.2 cm breit, der Stiel rinnig, c. 1.5—5 cm lang. Blütenstände am Grunde der Trugknollen, aufsteigend, an der Spitze eine nickende, dichte, zylindrische, mehr- bis vielblütige Ähre tragend; Pedunculus dünn, blass, sehr dicht und fein purpurn gestreift, mit wenigen röhrigen, zugespitzten, blassen, bis

c. 0.425 cm langen Schaftblättern, 5.5—15 cm lang; Rachis etwas dicker, kantig, 0.8—3.5 cm lang. Brakteen anliegend, länglich dreieckig, sehr spitz, konkav, blassgrün, mehr oder weniger purpurn punktiert, bis c. 0.2 cm lang. Blüten klein, allseitswendig, sitzend, dachig, etwas fleischig, c. 0.35—0.4 cm lang, die Sepalen und Petalen blassgrün, purpurn punktiert. Unpaares Sepalum breit eirund bis länglich dreieckig, stumpf oder stumpflich, konkav, 0.25—0.3 cm lang, 0.15—0.25 cm breit. Paarige Sepalen vorgestreckt, schief dreieckig, schwach sichelig, sehr kurz zugespitzt oder spitz, papillös, 0.275—0.3 cm lang, 0.175 cm breit. Petalen schief eirundlich länglich bis lanzettlich, sehr kurz zugespitzt bis sehr spitz zugespitzt, 0.17—0.25 cm lang, 0.06—0.08 cm breit. Lippe beweglich, kurz, stark zurückgekrümmt, der untere Teil stark rinnig konkav und unten konvex, vorn stark konvex mit einer von konvexen Rändern begrenzten Längsrinne, an der Spitze abgerundet, mit ausser an der Basis stark zurückgebogenen, über der Basis ein kleines, aufrechtes, stumpfes Läppchen bildenden Rändern, papillös, in der Rinne sehr kurz behaart, blassgelbgrünlich, in der Mitte ausser der Spitze schwarzpurpurn, 0.1—0.125 cm lang, 0.1 cm breit. Säule kurz, breit, weisslich, nach oben purpurn, 0.07 cm lang; Öhrchen die Anthere überragend, ungefähr schief länglich, spitz, aussen konvex. Anthere ziemlich flach, an der Spitze stumpf 2zähnig, weisslich, in der Mitte grünlich, 0.05—0.06 cm breit. Pollinien 4, die inneren viel kleiner als die äusseren, durchscheinend, glänzend, gelb. Narbe dreieckig rundlich. Säulenfuss mit dem Ovarium einen stumpfen Winkel bildend, dick, weisslich, an der Spitze purpurn, 0.075 cm lang. Ovarium sitzend, sehr kurz, dick verkehrt kegelig, 6furchig, purpurn, 0.06—0.08 cm lang. Frucht sitzend, weitabstehend, schief länglich verkehrt eiförmig, grün, purpurn angelaufen, 0.9 cm lang, 0.4 cm dick.

***Bulbophyllum gomphreniflorum** J. J. S. n. sp.

Caespitosum. Rhizoma abbreviatum, innovationibus vaginis tectis, vagina ultima maxima, acuta, carinata, pallida, c. 1.4 cm. longa. Pseudobulbi parvi, aggregati, subglobosi, pisiformes, apice impressi, nitidi, dilute virides, c. 0.35—0.37 cm. diam., 1folii. Folium oblongum, obtusum, basi cuneato-contractum, convexum

cum sulco longitudinali, crasse carnosum, nitidule viride, subtus opacum, c. 4—5.25 cm. longum, 1.5—1.75 cm. latum. Inflorescentiae e basi pseudobulborum, breves, capituliformes, pluriflorae, pedunculo pallide virescenti ad viridi-albo, c. 1.25—2.5 cm. longo, nonnullis vaginulis tubulosis acuminatis carinatis pallidis ad c. 0.4 cm. longis donato, rachide crassiuscula, glabra, pallide virescenti, c. 0.4 cm. longa, cum floribus c. 0.7—0.8 cm. diam., 0.8—0.85 cm. longa. Bracteae adpressae, triangulae, acutae ad satis obtusae, concavae, pallidae, ad c. 0.225 cm. longae. Flores c. 12—13, parvi, quaquaversi, erecto-patentes, imbricantes, carnosuli, succosi, c. 0.45 cm. longi, sepalis petalisque conniventibus. Sepalum dorsale porrectum, subrectum, apice breviter recurvulum, oblongum, superne angustatum, obtusum, concavum, dorso ad apicem verruculosum, albidum, striis 3 longitudinalibus purpureis, c. 0.4 cm. longum, 0.2 cm. latum. Sepala lateralia porrecta, marginibus proximis contigua, oblongo-triangula, falcata, leviter sigmoïdea, obtusa, concava, extus convexa et minute papillosa, albida, pallide purpureo-suffusa, margine basi excepta dilute purpurea, striis 3 purpureis notata, fere 0.4 cm. longa, basi fere 0.2 cm. lata. Petala parallela gynostemio porrecta, subovato-oblonga, brevissime acuminata, basi obtusa medio tantum affixa, concava, dorso obtusangule convexa, alba, margine superne dilute purpureo-suffusa, costa media purpurea, stria 1 brevi purpurea inferne addita, c. 0.275 cm. longa, 0.13 cm. lata. Labellum mobile, oblongo-linguiforme, medio fere obtusangule recurvum, inferne alte canaliculatum, canalicula costis 2 conspicuis erectis usque ad $^1/_3$ infra apicem productis basi angulum rectum formantibus limitata, parte antica convexum, obtusum, margine praesertim apicem versus papillosum, subtus superne longitudinaliter sulcatum, purpureum, striis 3 atropurpureis, margine pallido, subtus albidum, bene 0.2 cm. longum, bene 0.1 cm. latum. Gynostemium breve, dorso convexum, albidum, utrinque stria longitudinali pallide purpurea notatum, c. 0.125 cm. longum, apice obtuso, auriculis porrectis, antheram superantibus, obliquis, margine antico et postico obtusangule dilatatis, longius subulato-acuminatis. Anthera firme affixa, cucullata, reniformis, apice breviter rotundato-producta, dilute flava, c. 0.05 cm. lata. Pollinia 4, flava. Stigma semilunatum. Pes gynostemii cum ovario angulum obtusum faciens, brevis, oblongo-triangulus, apice incurvulus, obtusus, convexus, albidus, apice purpureus, usque ad apicem

ovarii (dorso) c. 0.1 cm. longus. Ovarium sessile, obconicum, alte 6sulcatum, flavescenti-albidum, purpureo-suffusum, c. 0.15—0.175 cm. longum. Capsula submatura patens, sessilis, oblongo-fusiformis, obtuse trigona, valde obtuse 6costata, obtusa, basi breviter contracta, dilute viridis, c. 0.85 cm. diam.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber, in c. 1100 m ü. d. M. (W. F. Winckel, bl. und fr. im Mai und Juli 1917; kult. unter n. 311).

Verwandt mit *B. cylindraceum* Lndl., *B. obscurum* J. J. S., *B. globiceps* Schltr. u. s. w., und also zur Sektion *Globiceps* gehörig. Unter den javanischen Arten dieser Gruppe ist die Pflanze kenntlich an die kugeligen, kurz gestielten Blütenstände.

Bulbophyllum gomphreniflorum J. J. S.

Rhizom kurz, anfangs mit röhrigen Scheiden. Trugknollen zusammengehäuft, klein, erbsenförmig, glänzend, hellgrün, c. 0.35—0.37 cm im Durchmesser, 1blättrig. Blätt länglich, stumpf, an der Basis keilig verschmälert, konvex mit einer Längsrinne, dickfleischig, schwach glänzend grün, unten matt, c. 4—5.25 cm lang, 1.5—1.75 cm. breit. Blütenstände am Grunde der Trugknollen, kurz, kopfförmig, ziemlich vielblütig; Pedunculus blassgrünlich bis grünweiss, c. 1.25—2.5 cm lang, mit wenigen röhrigen, zugespitzten, gekielten Schaftblättern; Rachis etwas dicker, blassgrünlich, c. 0.4 cm. lang, mit den Blüten c. 0.7—0.85 cm lang und breit. Brakteen anliegend, dreieckig, spitz oder ziemlich stumpf, konkav, blass, bis 0.225 cm lang. Blüten c. 12—13, klein, allseitswendig, aufrecht abstehend, dachig, saftig, c. 0.45 cm lang, mit zusammengeneigten Sepalen und Petalen. Unpaares Sepalum vorgestreckt, nahezu gerade, länglich, nach oben verschmälert, stumpf, konkav, aussen an der Spitze kleinwarzig, weisslich mit 3 purpurnen Längsstrichen, c. 0.4 cm lang, 0.2 cm breit. Paarige Sepalen mit den benachbarten Rändern aneinander stossend, länglich dreieckig, sichelig, stumpf, konkav, aussen kleinpapillös, ungefähr gefärbt wie das unpaare Sepalum, c. 0.4 cm lang, 0.2 cm breit. Petalen länglich eirund, sehr kurz zugespitzt, konkav, weiss mit purpurner Mittellinie und einem kurzen Strich an der Basis, c. 0.275 cm lang, 0.13 cm breit.

Lippe beweglich, länglich zungenförmig, in der Mitte stumpfwinkelig zurückgebogen, der untere Teil rinnig mit 2 starken, bis $1/_3$ unterhalb der Spitze fortlaufenden Längsleisten, der vordere Teil konvex, stumpf, am Rande papillös, purpurn, mit 3 dunkelpurpurnen Längsstrichen und blassem Rande, 0.2 cm lang, 0.1 cm breit. Säule kurz, weisslich, beiderseits mit einem blasspurpurnen Längsstrich, c. 0.125 cm. lang; Öhrchen vorgestreckt, die Anthere überragend, schief, der Ober- und Unterrand stumpfwinkelig verbreitert, pfriemlich zugespitzt. Anthere nierenförmig, an der Spitze kurz abgerundet vorgezogen, hellgelb, 0.05 cm breit. Pollinien 4, gelb. Narbe halbmondförmig. Säulenfuss mit dem Ovarium einem stumpfen Winkel bildend, kurz, länglich dreieckig, stumpf, weisslich, an der Spitze purpurn, 0.1 cm lang. Ovarium sitzend, verkehrt kegelig, 0.15—0.175 cm lang.

*__Bulbophyllum rubiferum__ J. J. S. n. sp.

Rhizoma repens, teres, vaginatum, c. 0.175—0.45 cm. diam. Pseudobulbi approximati, ad c. 0.2 cm. distantes, oblique subglobosi, subovoidei vel depresse globosi, apice depressi, nitide virides, c. 0.5—0.8 cm. alti, 0.65—0.95 cm. diam., 1folii. Folium erectum, petiolatum, oblongum ad lanceolatum, obtusum, basi sensim angustatum, in utraque canaliculae parte convexum, dorso obtusangule convexum, carnosum, nitidule viride, subtus opacum et paulo pallidius, totum c. 9.5—11 cm. longum, petiolo canaliculato 1.5—2 cm. longo, 1.1—2.2 cm. latum. Inflorescentiae e basi pseudobulborum, adscendentes, apice racemum abbreviatum densissimum ovoideo-globosum vel semiglobosum multiflorum c. 1.15—1.5 cm. diam. gerentes, pedunculo tereti, sordide atropurpureo, c. 10—13.5 cm. longo, 0.06—0.1 cm. diam., vaginulis c. 4 tubulosis ad c. 0.6 cm. longis donato, rachide bene crassiore, fusiformi, dilute viridi, c. 0.35—0.6 cm. longa. Bracteae persistentes, patentissimae, triangulae, acutae, erosulae, concavae, purpurascentes, c. 0.1 cm. longae. Flores c. 20—32, quaquaversi, patentissimi, parvi, succosi, c. 0.4 cm. longi, 0.25 cm. lati. Sepalum dorsale ovarium continuum, oblongum, apice recurvulo angustatum, obtusum, concavum, album, margine purpureum, striis 3 longitudinalibus atropurpureis apice confluentibus, c. 0 4 cm. longum, 0.2 cm. latum. Sepala lateralia porrecta, valde oblique et late ovata, obtusa, apice subapiculata, basi obliqua lata, concava,

medio transverse convexa, colore sepali dorsalis sed striis exterioribus apicem non attingentibus, c. 0.375 cm. longa, medio 0.275 cm., basi bene 0.2 cm. lata. Petala porrecta, gynostemio adpressa, obovata, apice triangulo-producta, satis acuta, superne erosula, concava, alba, margine purpurascentia, stria mediana atropurpurea apice dilatata ornata, c. 0.24 cm. longa, fere 0.14 cm. lata. Labellum mobile, breve, crassum, ante medium abrupte recurvum, parte inferiore marginibus erectis intus convexis extus concavis canaliculata et costulis 2 inconspicuis longitudinalibus convexis instructa, parte antica valde convexa subtus concava apice late rotundata, subtus longitudinaliter sulcatum, breviter papillosum, opacum, purpureum, c. 0.24 cm. longum, 0.175 cm. latum. Gynostemium breve, sordide pallide flavescens, usque ad apicem auricularum c. 0.125 cm. longum, apice obtuso cum filamento minimo filiformi, auriculis antheram superantibus, falcatis, e basi oblique oblonga subulato-acuminatis. Anthera cucullata, ambitu subquadrata, 4lobulata, lobulis sinibus latis sejunctis, apice quam basin paulo angustior, dilute viridis, lobulis basilaribus albis, c. 0.06 cm. lata, thecis ovalibus convexis. Pollinia 4, valde inaequalia, in corpuscula 2 oblique obovata unita, semipellucida, nitida, pallide flava, fere 0.04 cm. longa. Pes gynostemii ovarium fere continuus, apice incurvulus, truncatus, subbicostulatus, nitide atropurpureus, bene 0.1 cm. longus. Ovarium obconicum, 6sulcatum, dilute viride, c. 0.15 — 0.16 cm. longum; pedicellus bene tenuior, albus, bene 0.1 cm. longus. Fructus brevissime pedicellatus, oblongus, obtusus, valde 6sulcatus, viridis, c. 1.1 — 1.2 cm. longus, 0.45 — 0.5 cm. diam.

Java: Priangan, Tjadas Malang bei Tjibeber in c. 1000 m ü. d. M. (W. F. Winkckel, bl. und fr. im Juli 1917, kult. unter n. 355). Goenoeng Gombeng bei Soekanegara in c. 1000 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im Juli 1917).

Es ist bemerkenswert, dass ein kleines Areal wie Tjadas Malang plötzlich mehrere Arten der kleinen Sektion *Globiceps* geliefert hat. Es sind dies *B. rubiferum* J. J. S., *B. gomphreniflorum* J. J. S., *B. obscurum* J. J. S. und *B. submarmoratum* J. J. S.

B. rubiferum, das habituell und in der Form der Blütenstände

B. gomphreniflorum am meisten ähnlich ist, unterscheidet sich durch die lang gestielten Blütenstände, dunklere Färbung der Blüten, gegen die Spitze verbreiterten Petalen, die stark zurückgekrümmte Lippe, Form der Säule u. s. w.

Die Blütenstände imitieren eine *Rubus*frucht.

Bulbophyllum rubiferum J. J. S.

Rhizom kriechend, mit Scheiden, c. 0.175 cm dick. Trugknollen genähert, mehr oder weniger kugelig, glänzend, grün, c. 0.5—0.8 cm hoch. Blatt aufrecht, gestielt, länglich bis lanzettlich, stumpf, am Grunde verschmälert, beiderseits der rinnigen Mittelrippe konvex, fleischig, schwach glänzend grün, unten matt und etwas blasser, im ganzen c. 9.5—11 cm lang, 1.1—2.2 cm breit, der rinnige Stiel 1.5—2 cm lang. Blütenstände am Grunde der Trugknollen, aufstrebend, an der Spitze eine sehr dichte, vielblütige, eiförmige bis halbkugelige, c. 1.15—1.5 cm breite Traube tragend; Pedunculus schmutzig dunkelpurpurn, c. 10—13.5 cm lang, 0.06—0.1 cm dick, mit c. 4 röhrigen Schaftblättern; Rachis dicker, spindelig, hellgrün, c. 0.35—0.6 cm lang. Brakteen weitabstehend, dreieckig, spitz, ausgefressen, konkav, 0.1 cm lang. Blüten c. 20—32, weitabstehend, klein, saftig, c. 0.4 cm lang, 0.25 cm breit, die Sepalen weiss mit purpurnem Rande und 3 dunkelpurpurnen Längsstrichen. Unpaares Sepalum länglich, an der Spitze zurückgebogen und verschmälert, stumpf, konkav, 0.4 cm lang, 0.2 cm breit. Paarige Sepalen vorgestreckt, sehr schief und breit eirund, stumpf, mit einem sehr kleinen Spitzchen, c. 0.375 cm lang, in der Mitte 0.275 cm, am Grunde gut 0.2 cm breit. Petalen vorgestreckt, der Säule angedrückt, verkehrt eirund, an der Spitze dreieckig zugespitzt, ziemlich spitz, nach oben ausgefressen, konkav, weiss, am Rande purpurrötlich, mit einem dunkelpurpurnen, an der Spitze verbreiterten Längsstrich, 0.24 cm lang, 0.14 cm breit. Lippe beweglich, kurz, dick, vor der Mitte abgebrochen zurückgekrümmt, der untere Teil durch aufrechte, innen konvexe, aussen konkave Ränder rinnig und mit 2 schwachen Längsrippchen, der vordere Teil stark konvex, breit abgerundet, matt, purpurn, c. 0.24 cm lang, 0.175 cm breit. Säule kurz, schmutzig gelblich, c. 0.125 cm lang; Öhrchen die Anthere überragend, sichelig, aus schief länglichem Grunde pfriemlich zugespitzt. Anthere im Umriss ungefähr vierkant, 4lappig, an der Spitze etwas schmäler als am Grunde, hellgrün mit weissen hinteren Läppchen, 0.06 cm breit. Pollinien 4, ungleich gross, zu 2 verkehrt eirunden Körperchen vereinigt, etwas durchscheinend, blassgelb, fast 0.04 cm lang. Säulenfuss vorgestreckt, an der Spitze etwas eingebogen, abgestutzt, glänzend, dunkelpurpurn, 0.1 cm lang. Ovarium verkehrt kegelig, 6furchig, hellgrün, c. 0.15 cm lang; Stielchen dünner, weiss, 0.1 cm lang. Frucht fast sitzend, länglich, stumpf, stark 6furchig, grün, c. 1—1.2 cm lang, 0.45—0.5 cm dick.

Cymbidium simulans Rolfe in Orch. Rev. XXV (1917), 175.

Rolfe hat l. c. festgestellt, dass die Pflanze, die gewöhnlich als *C. aloifolium* angesehen wurde, nicht das echte *C. aloifolium* von Swartz ist, und stellt daher für das falsche *C. aloifolium* einen neuen Namen, *C. simulans* Rolfe, vor.

Poaephyllum parviflorum Ridl. in Transact. Linn. Soc. 2nd ser. Bot. IX (1916), 192.—*Lectandra parviflora* J. J. S. in Bull. Dép. Agric. Ind. Néerl. No. XIII (1907), 55.—*L. pauciflora* Schltr. (pp) Orch. D. Neu-Guinea (1912), 363.

Wie Ridley l. c. angiebt, ist Part I der „Materials for a Flora of the Malay Peninsula", worin die Gattung *Poaephyllum* Ridl. publiziert wurde, erschienen im Anfang von 1907, so dass dieser Namen die Priorität hat vor *Lectandra* J. J. S., publiziert am Ende des genannten Jahres.

Schlechter glaubte die javanische Art mit *Poaephyllum pauciflorum* (Hook. f.) Ridl. identifizieren zu müssen, und vereinigte, in der Meinung dass *Lectandra* älter war als *Poaephyllum*, die beiden Pflanzen unter dem Namen *Lectandra pauciflora* Schltr. Ridley betrachtet sie jedoch als spezifisch verschieden und trennte die javanische Art unter obigem Namen wieder ab. Da ich kein Material der Art von Malaka gesehen habe und die Identität der beiden Pflanzen aus den Beschreibungen und Abbildung nicht mit Sicherheit hervorgeht, ist Ridleys Name in diesem Augenblick anzuwenden.

***Phalaenopsis javanica** J. J. S. n. sp.

Caulis abbreviatus, c. 3—5folius. Radices apice virides. Folia oblique oblonga ad ovalia, plus minusve obovata, apice obliqua uno latere subacuminata, mucronata, basin versus angustata, laxe undulata, costa media supra sulcata subtus acute carinata, carnosula, nitide viridia, ad c. 19—20 cm. longa, 6.75—9.3 cm. lata; vagina breviter tubulosa, sectione transversa ovalis, dilute viridis. Inflorescentiae vaginam ad basin perforantes, patentissimae, foliis plerumque multo breviores, deinde interdum ramosae, laxae, simultanee flores c. 2 gignentes, pedunculo tereti, viridi, c. 5—7.5 cm. longo, vaginulis c. 3 brevibus tubulosis infima excepta acuminatis carinatis dilute viridibus c. 0.25—0.4 cm. longis donato, rachide pedunculo paulo crassiore, facie florem versus spectante applanata, viridi, c. 2—10 cm. longa, diu florente, internodiis c. 0.35—1.2 cm. longis. Bracteae pedicello adpressae, rachidem semiamplectentes, triangulae, acutae, concavae, dorso carinatae, dilute virides, ad c. 0.35 cm. longae. Flores minusculi, carnosuli, nitidi, suaveolentes, c. 2.4—2.9 cm. lati, sepalis petalisque leviter incurvis, albidis, flavescentibus vel virescentibus, deinde pallidioribus, striis longitudinalibus c. 7—9 plus minusve distinctis tessellato-interruptis violaceo-castaneis vel cinnamomeis in sepalorum lateralium faciebus proximis saepe laetissimis in petalis saepe pallidissimis vel subobsoletis notatis. Sepalum dorsale late ovale, rotundatum, apiculo brevi obtuso lateraliter compresso dorso ad apicem, concavum, c. 1.3—1.65 cm. longum, 0.9—1 cm. latum. Sepala lateralia ad pedem gynostemii decurrentia, oblique ovata, obtusa, concava, margine sepalum dorsale versus spectante recurva, convexa, dorso carinata, carina ultra apicem in apiculum subulatum recurvum producta, c. 1.4—1.65 cm. longa, 1—1.225 cm. lata. Petala late elliptica, obtusa, convexa, c. 1.1—1.45 cm. longa, 0.85—1 cm. lata. Labellum apici pedis gynostemii insertum, immobile, basi pedem gynostemii continuum, deinde subrectangule porrectum, 3lobum, inexpansum c. 1.1—1.3 cm. longum, lamellis 2 horizontalibus adscendentibus in pedem gynostemii recurvis linearibus vel lineari-subulatis plerumque plus minusve 2dentatis subtus longitudinaliter sulcatis albis inter lobos laterales, lamella posticà multo breviore vel subnulla, callo porrecto lateraliter compresso satis alto albo dorso 2costulato apice acute 2dentato lobo intermedio adpresso anteposito; lobi laterales adscendentes, paralleli, basin gynostemii attingentes, falcati, lineari-oblongi, margine antico incrassati et inferne in carinam oblique decurrentem abientes, apice leviter dilatati et margine antico in lobulum erectum obtusum producti, margine postico in laciniam angustam ad pedem gynostemii falcato-incurvam producti, apice irregulariter crenulati, albi, margine antico medio flavi, basi pallide purpureo-suffusi, c. 0.56—0.6 cm. longi; lobus intermedius parallelus gynostemio porrectus, cum parte inferiore labelli angulum acutum faciens, carnosus, latius vel angustius ellipticus, basi contractus, convexus, subtus concavus et longitudinaliter 3sulcatus, obtusus, apice plus minusve sursum curvus convexo-incrassatus et pulvino parvulo pilorum instructus, subtus obtuse carinatus, apice plerumque appendice minuta subulata porrecta vel sursum curva munitus, apicem versus subfimbriato erosulus, dimidio inferiore supra carina longitudinali antice altiore truncata purpurascenti donatus, purpureus vel interdum lilacinus, basi albus, c. 1—1.2 cm. longus, 0.475—0.57 cm. latus. Gynostemium subrectum, supra visum ambitu ellipticum, apice valde productum obtusumque, basi contractum, dorso convexum, album, c. 0.6—0.7 cm. longum, clinandrio semielliptico, concavulo, erosulo-crenutato. Anthera cucullata, supra visa sexangulata, apice contracta obtusa et leviter retusa, costis 2 longitudinalibus validis basi apiceque approximatis medio valde obtusangule elevatis basi in appendicem lateraliter compressam retusam unitis ornata, connectivo inter costas leviter convexo, alba, c. 0.27 cm. longa. Pollinia 2, remota, oblique obovoidea, longitudinaliter sulcata, flavescentia, stipiti late spathulato inferne valde angustato ima basi leviter dilatato antice convexo albo inserta, glandula mediocri, subquinquangulari, acuta, tota c. 0.375 longa. Rostellum elongatum, bipartitum, laciniis angustis lineari-subulatis. Stigma magnum, fere totam faciem inferiorem gynostemii occupans, suborbiculare. Pes gynostemii cum gynostemio angulum obtusum, cum ovario angulum acutum faciens, rectus, apicem versus angustatus et a sepalis lateralibus liber, concavus, carnosus, albus, c. 0.37—0.5 cm. longus. Ovarium 6sulcatum, virescenti-album, c. 0.8—0.95 cm. longum, cum pedicello albo c. 2.1 cm. longum.

Java: Ohne Fundort. (Ploem in Herb. Lugd. Bat. n 909, 113—357). Priangan, an der Südküste zwischen Garoet und der

Wijnkoops-Bai. (Kult. in Hort. J. Schuller tot Peursum, Weltevreden, und in Hort. Bog.). Tjitjoeroek und Tjisokan bei Tjibeber in c. 1000 m ü. d. M.; ziemlich viel. (W. F. Winckel, bl. im September 1916, kult. unter n. 138).

Die Beschreibung wurde angefertigt nach einem Exemplar, das von Herrn J. Schuller tot Peursum von einem sundanesischen Pflanzensucher gekauft wurde, nach Angabe von Java stammen soll und April 1914 zum ersten Male blühte, und zachlreichen Exemplaren in Hort. Bog.

Die Art gehört zu den Verwandten der *Ph. violacea* T. et B., *Ph. sumatrana* Korth. et Rchb. f. usw., steht aber zufolge der ziemlich kleinen Blüten mit sehr breiten Sepalen und Petalen ziemlich isoliert da. Es ist nicht völlig ausgeschlossen, dass in dieser Pflanze *Ph. deliciosa* Rchb. f. vorliegt; die Beschreibung ist aber zu schlecht um die Sache zu entscheiden. Reichenbach beschreibt die Blätter seiner Art nur als 5—7.5 cm. lang und bis 2.5 cm. breit.

Phalaenopsis javanica J. J. S.

Stengel kurz, c. 3—5blättrig. Wurzelspitzen grün. Blätter schief länglich bis oval, mehr oder weniger verkehrt eirund, mit schiefer Spitze, die eine Hälfte etwas zugespitzt, mit einem Spitzchen, gegen die Basis verschmälert, weit wellig, mit oben gefurchter, unten scharf gekielter Mittelrippe, dünnfleischig, glänzend grün, bis c. 19—20 cm lang, 6.75—9.5 cm breit; Scheide kurz röhrig, auf dem Querschnitt oval, hellgrün. Blütenstände die Scheiden am Grunde durchbohrend, weit abstehend, meistens viel kürzer als die Blätter, später bisweilen verzweigt, locker, zugleicher Zeit c. 2 Blüten tragend; Pedunculus stielrund, grün, c. 5—7.5 cm lang, mit c. 3 kurzen, röhrigen, ausser der unteren, zugespitzten, gekielten, hellgrünen, c. 0.25 — 0.4 cm langen Scheiden; Rachis etwas dicker als der Pedunculus, zickzackig, an der Seite der Blüten abgeflächt, grün, c. 2—10 cm lang, lange fortwachsend, die Internodien c. 0.35—1.2 cm lang. Brakteen dem Blütenstielchen anliegend, die Rachis halb umfassend, dreieckig, spitz, konkav, aussen gekielt, hellgrün, bis c. 0.35 cm lang. Blüten ziemlich klein, dünnfleischig, glänzend, wohlriechend, c. 2.4—2.9 cm breit, die Sepalen und Petalen etwas vorwärts gebogen, weisslich, gelblich oder grünlich, später blasser, mit 7—9 mehr oder weniger deutlichen, fleckenförmig unterbrochenen, auf den einander zugewandten Hälften der paarigen Sepalen meistens sehr deutlichen, auf den Petalen meistens schwachen oder fast fehlenden, violettkastanienbraunen oder zimmtbraunen Längsstreifen. Unpaares Sepalum breit oval, abgerundet, mit einem kurzen, stumpfen, seitlich zusammengedrükten Spitzchen aussen an der Spitze, konkav, c. 1.3—1.65 cm lang, 0.9—1 cm breit. Paarige Sepalen am Säulenfuss herablaufend, schief eirund, stumpf, konkav, der dem unpaaren Sepalum zugewandte Rand zurückgebogen konvex, aussen gekielt, der Kiel in ein zurückgebogenes Spitzchen ausgehend, c. 1.4—1.65 cm lang, 1—1.225 cm breit. Petalen breit elliptisch, stumpf, konvex, c. 1.1—1.45 cm lang, 0.85—1 cm breit. Lippe der Spitze des Säulenfusses unbeweglich angeheftet, an der Basis in die Verlängerung des Säulenfusses abwärts gewandt, dann fast rechtwinkelig vorwärts gekrümmt, 3lappig, in der natürlichen Lage c. 1.1—1.3 cm lang, zwischen den Seitenlappen mit zwei horizontalen, aufsteigenden, gegen den Säulenfuss zurückgebogenen, linearen oder linear pfriemlichen, meistens mehr oder weniger 2zähnigen, unten mit einer Langsrinne versehenen, weissen Lamellen, von welchen die hintere sehr kurz ist oder nahezu fehlt, und darvor einem vorgestreckten, von der Seite zusammengedrückten, oben 2rippigen, ziemlich hohen, nach vorne spitz zweizähnigen, dem Mittellappen angedrückten, weissen Forsatz; Seitenlappen aufstrebend, parallel, die Basis der Säule erreichend, sichelig, linear länglich, der Vorderrand verdickt und nach unten in einen schräg herablaufenden Kiel übergehend, an der Spitze etwas verbreitert und am Vorderrande vor dem verdickten Rande in ein aufrechtes, stumpfes Läppchen ausgehend, der Hinterrand in eine dem Säulenfuss sichelig zugebogene, schmale Lazinie vorgezogen, an der Spitze unregelmässig gekerbt, weiss, in der Mitte am vorderen Rande gelb, an der Basis blasspurpurn überlaufen, c. 0.56—0.6 cm lang; Mittellappen vorgestreckt, mit dem unteren Teil der Lippe einen spitzen Winkel darstellend, der Säule parallel, fleischig, breiter oder schmäler elliptisch, an der Basis zusammengezogen, konvex, unten konkav mit 3 Längsfurchen, stumpf, an der Spitze mehr oder weniger aufwärts gebogen, oben polsterig verdickt und mit einem ziemlich kleinen Haarkissen versehen, unten stumpf gekielt, an der Spitze meistens mit einem kleinen, vorragenden oder aufwärts gebogenen, pfriemlichen Forsatz, am Rande gegen die Spitze etwas fransig ausgefressen, die untere Hälfte oben mit einem nach vorne erhöhten, abgestutzten, blasspurpurnen Längskiel, heller oder dunkler purpurn oder hellviolett, mit weisser Basis, c. 1—1.2 cm lang, 0.475—0.57 cm breit. Säule nahezu gerade, von oben gesehen im Umriss elliptisch, die Spitze stark vorgezogen, stumpf, am Grunde zusammengezogen, mit konvexem Rücken, weiss, c. 0.6—0.7 cm lang; Clinandrium halbelliptisch, schwach konkav, am Rande klein ausgefressen gekerbt. Anthere kappig, von oben gesehen 6eckig, an der Spitze zusammengezogen, stumpf und etwas eingedrückt, mit 2 starken, gegen die Basis und Spitze einander zugebogenen, in der Mitte stark stumpfwinkelig erhabenen, an der Basis zu einem vorspringenden, seitlich zusammengedrückten, eingedrückten Anhängsel vereinigten Längsleisten, das Konnektiv zwischen den Leisten schwach konvex, weiss, c. 0.27 cm lang. Pollinien 2, entfernt, schief verkehrt eiförmig, mit einer Längsfurche, blassgelb, auf einem breit spateligen, stumpfen, an der Basis etwas verbreiterten, vorn konvexen, weissen Stielchen, mit mässiger, ungefähr 5eckiger, spitzer Klebmasse, im ganzen c. 0.375 cm lang. Rostellum verlängert, in 2 lange, schmale, linear pfriemliche Lazinien geteilt. Narbe sehr gross, nahezu die ganze Unterseite der Säule bedeckend, ungefähr rund. Säulenfuss mit der Säule einen stumpfen, mit dem Fruchtknoten einen spitzen Winkel darstellend, gerade, gegen die Spitze verschmälert und frei von den paarigen Sepalen, konkav, fleischig, weiss, c. 0.37—0.5 cm lang. Fruchtknoten 6furchig, grünlich weiss, c. 0.8—0.95 cm lang, mit dem weissen Stielchen c. 2.1 cm lang.

Chroniochilus J. J. S. n. gen.

Sepala petalaque subsimilia, sepala lateralia ad basin pedis gynostemii decurrentia, omnia intus parcissime muriculato-puberula. Labellum pedi gynostemii elastice insertum, late unguiculatum, subtrilobum, ecalcaratum, lobis lateralibus conspicuis, callo inter lobos cum ungue excavationem formante, lobo intermedio valde carnoso-producto, calcar imitante, lamina obsoleta. Gynostemium longiusculum, pede conspicuo apice libero. Anthera breviuscule rostrata. Pollinia 2, subglobosa, esulcata, stipite oblongo, glandula majuscula. Rostellum magnum. Stigma magnum.

Planta parva, caule brevi, paucifolio, foliis ellipticis. Inflore-

scentiae breves, simplices, pauciflorae. Flores parvuli, diu viriditatem conservantes.

Chroniochilus tjidadapensis J. J. S. n. sp.

Planta minima. Caulis brevissimus, c. 0.4 cm. longus, radicans, c. 3folius. Folia patentia, basi leviter torta, oblique elliptica, oblique subacuta vel inaequaliter 2dentata, apicem versus suberosula, supra in utraque parte canaliculae longitudinalis convexa, subtus obtusangule convexa et apice carinata, crasse carnosa, c. 0.7 — 0.85 cm. longa, 0.4 — 0.43 cm lata; vaginae brevissimae, sese amplectentes. Inflorescentiae foliis breviores, pauciflorae, pedunculo c. 0.2 cm. longo, nonnullis vaginulis tubulosis apiculatis carinatis donato, rachide subverruculosa, c. 0.2 cm. longa. Bracteae alternatim bifariae, patentes, rachidem amplectentes, triangulae, concavae, acutae, carinatae, erosae, c. 0.15 — 0.17 cm. longae. Flores c. 3 — 4, parvi, valde aperti, c. 0.62 cm. lati, diu viriditatem conservantes. Sepalum dorsale oblongum, concavum, apice leviter contractum obtusum recurvulum convexum et erosulum, intus ad basin densius ceterum parcissime pilis minimis muriciformibus instructum, 1nervium, c. 0.36 cm. longum, 0.175 cm. latum. Sepala lateralia ad pedis gynostemii partem inferiorem decurrentia, oblique ovato-oblonga, obtusa, in utraque costae parte convexa, costa dorso incrassata, intus nonnullis pilis brevibus donata, 1nervia, c. 0.33 cm. longa, 0.18 cm. lata. Petala oblique subelliptica, medio conspicue concava, margine apiceque recurva et convexa, praesertim margine inferiore erosula, intus pilis minimis rarissimis donata, 1nervia, bene 0.3 cm. longa, 0.175 cm. lata. Labellum pedi gynostemii elastice insertum, porrectum, breviter unguiculatum, 3lobum, ecalcaratum, c. 0.3 cm., usque ad apicem loborum lateralium 0.37 cm. longum, ad lobos laterales 0.24 cm. latum, ungue brevi, late cuneato-quadrangulo, convexo, subcostulato, 5nervio, basi c. 0.15 cm., apice 0.2 cm. lato; lobi laterales conspicui, oblique reversi, divergentes, supra medium obtusangule incurvi, oblongo-trianguli, obtusi, margine postico tenuiusculi, intus antice convexo-incrassati, margine postico inferne excepto ciliolati, dimidio superiore intus papillosi, callo brevi longitudinali lateraliter compresso rotundato cum ungue labelli excavationem formante inter lobos laterales; lobus intermedius porrectus, rectus, carnosus, conicus, subtus planus, supra convexus, apice truncato-obtusus. Gy-

nostemium longiusculum, curvulum, superne conspicue dilatatum, subclavatum, basi sepalo dorsali brevissime adnatum, c. 0.22 cm. longum, apice obtusum, clinandrio concavo. Anthera cucullata, transverse ovalis, in rostrum triangulum acutum producta, c. 0.13 cm. lata. Pollinia 2, subglobosa, esulcata, stipite oblongo convexo, glandula majuscula, tota c. 0.15 cm. longa. Rostellum magnum, cum gynostemio angulum subrectum faciens, alte in lacinias 2 triangulas acutas partitum. Stigma maximum, suborbiculare, alte excavatum, margine inferiore lobulo prominente obtuso instructum. Pes gynostemii cum ovario angulum subrectum faciens, oblongus, incurvulus, apice recurvulus, late obtusus, $^3/_5$ partibus inferioribus cum sepalis lateralibus connatus, apice liber, intus convexus, c. 0.15 cm. longus. Ovarium 6sulcatum, furfuraceum, c. 0.175 cm. longum.

Java: Priangan, Tjidadap bei Tjibeber in c. 1000 m ü. d. M., auf Theesträuchern. (R. C. Bakhuizen van den Brink, bl. im Oktober 1916; kult. in Hort. W. F. Winckel unter n. 235).

Ich erachte es wünschenwert diese Pflanze in eine neue Gattung zu stellen, da sie in keine der bis jetzt aufgestellten Gattungen ungezwungen unterzubringen ist. Vor *Sarcochilus* ist sie ausgezeichnet durch die nicht gespornte, vorn feste Lippe, nicht gefurchte Pollinien und den langen Dauer der Blüten, vor *Saccolabium*, das ebenfalls ungefurchte Pollinien besitzt, durch die dem Säulenfuss elastisch inserierte, ungespornte Lippe. Von *Chamaeanthus*, das mit der neuen Gattung die ungespornte Lippe gemein hat, unterscheidet sie sich durch die Aushöhlung am Grunde der Lippe, die ungefurchten Pollinien und die lange Dauer der Blüten.

Die Blüten erinnern sehr stark an die von Schlechter zu seiner Sektion *Monanthochilus* von *Sarcochilus* gestellten Arten. Schlechter beschreibt jedoch den vorderen, vorgestreckten Teil der Lippe als Sporn und bei den Pollinien wird nirgendwo angegeben, ob sie ganz oder gefurcht sind. Bei meinen Kopien der Schlechterschen Skizzen befindet sich keine Lippe im Längsschnitt.

Die Blüten sind nach Angabe von Herrn R. C. Bakhuizen van den Brink durchscheinend hellgelb, die Lippe hellgelb und halten sich mehr als vierzehn Tage.

Beschreibung nach einer in Alkohol konservierten Pflanze.

Chroniochilus J. J. S.

Sepalen und Petalen ziemlich gleich, die paarigen Sepalen am Grunde des Säulenfusses herablaufend, alle innen sehr spärlich weichstachelig kurzhaarig. Lippe dem Säulenfuss elastisch angeheftet, breit genagelt, etwas dreilappig, nicht gespornt, mit einem mit dem Nagel eine Aushöhlung bildenden Callus zwischen den Seitenlappen; Seitenlappen ziemlich gross; Mittellappen in einen fleischigen, vorgestreckten, spornähnlichen Teil verlängert, die Platte nahezu fehlend. Säule ziemlich lang, mit gut ausgebildetem, an der Spitze freiem Fuss. Anthere ziemlich kurz geschnäbelt. Pollinien 2, nahezu kugelig, nicht gefurcht, auf einem länglichen Stielchen mit ziemlich grosser Klebmasse. Rostellum gross. Narbe gross.

Kleine Pflanze. Stengel kurz, wenigblättrig. Blätter elliptisch. Blütenständ kurz, unverzweigt, wenigblütig. Blüten ziemlich klein, sich längere Zeit halten.

Chroniochilus tjidadapensis J. J. S.

Sehr kleine Pflanze. Stengel sehr kurz, wurzelnd, c. 0.4 cm lang. Blätter c. 3, abstehend, schief elliptisch, spitzlich oder ungleich 2zähnig, gegen die Spitze etwas ausgefressen, oben konvex mit einer Längsrinne, unten gegen die Spitze gekielt, dickfleischig, c. 0.7 — 0.85 cm lang, 0.4 - 0.45 cm breit; Scheiden sehr kurz, einander umfassend. Blütenstände kürzer als die Blätter, wenigblütig; Pedunculus c. 0.2 cm lang, mit wenigen röhrigen, mit einem Spitzchen versehenen, gekielten Schaftblättern; Rachis etwas warzig, c. 0.2 cm lang. Brakteen 2zeilig, abstehend, die Rachis umfassend, dreieckig, konkav, spitz, gekielt, ausgefressen, c. 0.15 — 0.17 cm lang. Blüten 3 — 4, klein, weit geöffnet, sich längere Zeit haltend, c. 0.62 cm breit. Sepalen länglich eirund, stumpf, innen mit wenigen kurzen, dicken Härchen, 1nervig, c. 0.36 — 0.33 cm lang, 0.175 cm breit. Petalen schief elliptisch, stumpf, in der Mitte stark konkav, mit konvexem Rande und Spitze, am unteren Rande ausgefressen, gut 0.3 cm lang, 0.175 cm breit. Lippe beweglich, 3lappig, ungesspornt, c. 0.3 cm, bis zur Spitze der Seitenlappen 0.37 cm lang, mit kurzem, breitem, keilig viereckigem, schwach gerripptem Nagel, innen zwischen den Seitenlappen mit einer kurzen, seitlich zusammengedrückten, abgerundeten, mit der Lippe eine Aushöhlung bildenden Längsverdickung;

Seitenlappen ziemlich gross, divergierend, an der Spitze stumpfwinkelig eingebogen, länglich dreieckig, stumpf, innen nach vorne konvex verdickt, am Hinterrande ausser der Basis kurz gewimpert, die obere Hälfte innen papillös; Mittellappen vorgestreckt, gerade, fleischig, kegelig, stumpf, unten flach, oben konvex. Säule ziemlich schlank, leicht gebogen, nach oben stark verbreitert, stumpf, c. 0.22 cm lang. Anthere quer oval, mit einem dreieckigen, spitzen Schnäbelchen, 0.13 cm breit. Pollinien 2, ungefähr kugelig, nicht gefurcht, auf einem länglichen Stielchen, mit ziemlich grosser Klebmasse, im ganzen 0.15 cm lang. Rostellum gross, tief in 2 spitze Lazinien geteilt. Narbe gross, rundlich, tief, am unteren Rande mit einem vorspringenden, stumpfen Läppchen. Säulenfuss mit dem Ovarium einen ungefähr rechten Winkel bildend, länglich, schwach gebogen, an der Spitze etwas zurückgebogen, stumpf, der obere Teil frei, konvex, 0.15 cm lang. Ovarium 6furchig, kleiig, 0.175 cm lang.

***Sarcochilus fraternus** J. J. S. n. sp.

Caulis satis brevis, leviter serpentinus, sectione transversa ovalis, viridis, c. 10—12 cm. longus, internodiis c. 0.5—0.7 cm. longis. Folia pauca, patentissima, plus minusve oblique lanceolata vel lineari-lanceolata, apice angustata, oblique bidentata, supra in utraque parte costae mediae supra sulcatae subtus non prominentis convexa, nitide viridia, carnosa, c. 5.75—10 cm. longa, 1.6—1.5 cm. lata; vaginae tubulosae, sectione transversa ellipticae, virides, internodia aequantes vel paulo superantes, c. 0.35 cm. latae. Inflorescentiae vaginam dorso ad basin perforantes, patentissimae, diu florentes, multiflorae, pedunculo sectione transversa elliptico, dilute viridi, c. 1.3—2.7 cm. longo, nonnullis vaginulis brevissimis donato, rachide pedunculo crassiore, compresso, dilute viridi, 11.5 cm. et plus longa, internodiis c. 0.25—0.3 cm. longis, latere floris insertionis excavatione alta ovato-triangula margine acuta praeditis. Bracteae alternatim bifariae, brevissimae, latae, rachidem semiamplectentes, adpressae, obtusissimae. Flores numerosi, intervallis aperti, ephemeri, in excavationibus rachidis inserti, sepalis petalisque flavis, irregulariter castaneo-maculatis. Sepalum dorsale ellipticum, obtusum, basi breviter unguiculato-contractum, concavum, apice recurvulum convexumque, c. 0.65 cm. longum, 0.37 cm. latum. Sepala

lateralia brevissime ad pedem gynostemii decurrentia, oblique spathulata, concava, apice convexa, ungue breviusculo, lamina oblique angulato-obovata, obtusa, tota c. 0.7 cm. longa, bene 0.4 cm., basi 0.2 cm. lata. Petala oblique spathulata, concava, dorso obtusangule convexa, apice obtusa et irregulariter marginata, ungue angustiusculo, lamina elliptica, tota c. 0.675 cm. longa, bene 0.3 cm., basi 0.1 cm. lata. Labellum mobile, porrectum, 3lobum, totum c. 0.47 cm. longum; lobi laterales basilares, erecti, divergentes, oblongo-lineares, falcato-incurvi, obtusi, intus convexi, papillosi, callo albo postice decurrente intus ad basin, intus castanei, pallide flavescenti-marginati, dorso pallide flavescentes, cinnamomeo-suffusi, usque ad basin labelli c. 0.3 cm., margine antico 0.16 cm. longi, 0.06 cm. lati; lobus intermedius erectus, abbreviatus, latus, transverse calliformis, margine utrinque recurvulus, angulato rotundatus, obtusissimus, papillosus, carnosus, albus, c. 0.17 cm. latus; calcar porrectum, conicum, apice subabrupte contractum, supra inferne convexo-tumidum, incrassatione constrictione transversa a basi lobi intermedii separata canalicula longitudinali didyma papillosa, basi flavescenti-album, ceterum apice pallide flavo excepto castaneum, usque ad basin labelli c. 0.325 cm. longum, 0.2 cm. latum, pariete antico carnoso intus albo-villosulo, pariete postico tenuiusculo intus papilloso. Gynostemium breve, rectum, truncatum, castaneum, c. 0.2 cm. longum, clinandrio concavulo. Anthera plano-cucullata, transverse ovalis, apice triangulo-producta, vix tridenticulata, tenuiter membranacea, flavescenti-alba, c. 0.12 cm. lata. Pollinia 2, leviter compressa, rotundato-triangula, dorso inferne oblique fissa, pallide flava, cum stipite obverse oblongo-triangulo pallide flavo et glandula lata antice acuta c. 0.1 cm. longa. Rostellum longiusculum, acute bidentatum. Stigma magnum, suborbiculare, alte excavatum. Pes gynostemii cum ovario angulum rectum faciens, supra basin vix obtusangule incurvulus, ceterum rectus, magnam partem a sepalis lateralibus liber, linearis, convexus, apice attenuatus, contractus, papillosus, castaneus, stria longitudinali flavescenti-alba, apice macula rubra notatus, c. 0.26 cm. longus. Ovarium pallide flavum, c. 0.675 cm. longum. Fructus reversus, rectus, elongatus, tenuiusculus, obtuse sexangulato-cylindricus, 6sulcatus, distincte rostratus et gynostemio obtusangule incurvo coronatus, basi leviter pedicellato-contractus, nitide dilute viridis, totus c. 5—5.7 cm.

longus, 0.3 cm. diam., rostro cum gynostemio 0.725 cm. longo, pedicello 0.35 cm. longo, rima 1 longitudinali dehiscens.

Java: Priangan, Tjadas Malang (Tjidadap) bei Tjibeber, in c. 1000 m ü. d. M., zerstreut. (W. F. Winckel und R. C. Bakhuizen van den Brink, kult. unter n. 259, nahezu das ganze Jahr blühend).

Habituell ist diese Pflanze *S. compessus* Rchb. f. ganz ähnlich, und auch ihre Blütenstände zeigen keine wesentlichen Unterschiede, nur scheint sie in der Regel schwächer zu sein. Die Blütenfärbung stimmt mit der von *S. teres* Rchb. f. überein, wie auch die Form der Sepalen und des Mittellappens der Lippe. Die Seitenlappen sind verlängert und gekrümmt wie bei *S. compressus:* der Callus am Grunde ist aber grösser, wie bei *S. teres*. Auch der an der Vorderseite stark verdickte Sporn erinnert am *S. teres;* er ist aber an seiner Spitze kurz zusammengezogen und nicht erweitert.

Die Pflanze könnte sehr gut ein Bastard zwischen *S. compressus* Rchb. f. und *S. teres* Rchb. f. sein. Sie kommt jedoch in Tjadas Malang ziemlich häufig vor, und die Exemplare sind einander auffallend ähnlich.

Sarcochilus fraternus J. J. S.

Stengel ziemlich kurz, auf dem Querschnitt oval, grün, wenigblättrig, c. 10—12 cm. lang, die Internodien 0.5—0.7 cm lang. Blätter weit abstehend, schief lanzettlich oder linear lanzettlich, ungleich 2zähnig, glänzend grün, fleischig, 5.75—10 cm. lang, 1.6—1.5 cm breit; Scheiden röhrig, ungefähr ebenso lang wie die Internodien, grün. Blütenstände weit abstehend, vielblütig; Peduculus 1.3—2.7 cm lang, mit wenigen sehr kurzen Schaftblättern; Rachis dicker als der Pedunculus, zusammengedrückt, hellgrün, 11 cm und mehr lang; Internodien c. 0.25—0.3 cm lang, an der Seite der Blüte mit einer tiefen, eirund dreieckigen, scharf berandeten Aushöhlung. Brakteen zweizeilig, sehr kurz, breit, die Rachis halbumfassend, sehr stumpf. Blüten in Zwischenräumen blühend, eintägig. Sepalen und Petalen gelb, braunpurpurn gefleckt. Unpaares Sepalum elliptisch, stumpf, an der Basis zusammengezogen, konkav, c. 0.65 cm lang, 0.37 cm breit. Paarige Sepalen aus genagelter Basis schief eckig verkehrt eirund, stumpf, konkav, 0.7 cm lang, 0.4 cm breit. Petalen schief spatelig, stumpf, konkav, 0.675 cm lang, 0.3 cm breit. Lippe beweglich, 3lappig, 0.47 cm. lang; Seitenlappen am Grunde aufrecht, divergierend, linear länglich, sichelig vorwärts gebogen, stumpf, innen konvex, papillös, am Grunde mit einem weissen, nach hinten herablaufenden Callus, innen kastanienbraun, blassgelblich berandet, aussen blassgelblich, braun angelaufen, bis an die Basis der Lippe c. 0.3 cm, am Vorderrande 0.16 cm lang, 0.06 cm breit; Mittellappen aufrecht, sehr kurz, quer eckig abgerundet, sehr stumpf, mit beiderseits etwas zurückgebogenem Rande, papillös, fleischig, weiss, 0.17 cm breit; Sporn vorgestreckt, kegelig, an der Spitze zusammengezogen, vorn am Grunde konvex verdickt und papillös, die Verdickung durch eine Einschnürung von der Basis des Mittellappens getrennt und mit einer schwachen Längsrinne, kastanienbraun, am Grunde gelblich weiss, an der Spitze blassgelb, bis zur Basis der Lippe 0.325 cm lang, die Vorderwand dick fleischig und innen zottig, die Hinterwand dünn. Säule kurz, braun, 0.2 cm lang. Anthere schwach kappig, queroval, mit dreieckiger Spitze, weisslich, 0.12 cm breit. Pollinien 2, etwas zusammengedrückt, abgerundet dreieckig, gespalten, blassgelb, auf einem länglich verkehrt dreieckigen Stielchen mit breiter Klebmasse. Rostellum 2zähnig. Narbe gross, ungefähr rund. Säulenfuss mit dem Ovarium einen rechten Winkel bildend, nahezu gerade, nur am Grunde mit den paarigen Sepalen verwachsen, linear, papillös, braun mit einem weisslichen Längsstrich, an der Spitze mit einem roten Fleckchen, 0.26 cm lang. Ovarium blassgelb, 0.675 cm lang. Frucht zurückgerichtet, gerade, verlängert, ziemlich dünn, stumpf 6kantig zylindrisch, 6furchig, geschnabelt und von der stumpfwinkelig eingebogenen Säule gekrönt, am Grunde schwach stielförmig zusammengezogen, glänzend, hellgrün, im ganzen c. 5—5.7 cm lang, 0.3 cm im Durchmesser, mittels eines Längsrisses aufspringend.

Thrixspermum roseum J. J. S. n. sp.

Caulis brevis, c. 2—2.3 cm. longus, internodiis brevibus, radicibus elongatis. Folia lanceolato-linearia, plus minusve inaequaliter bidentata, sicco c. 2.7—5 cm. longa, 0.27—0.6 cm. lata; vaginae internodia superantes, inferne tubulosae, superne condu-

plicato-canaliculatae. Inflorescentiae multiflorae, diu florentes, pedunculo filiformi, c. 2.6—8.3 cm. longo, vaginulis c. 2 tubulosis donato, rachide pedunculo multo crassiore, flexuosa, 2.4 cm. superante, cum bracteis c. 0.325—0.37 cm. lata, internodiis 0.1 cm. non attingentibus. Bracteae alternatim bifariae, patentes, rachidem semiamplectentes, triangulae, acutae, basi concavae, dorso valde carinatae, dorso ad c. 0.175 cm. longae, inferiores adpressae et steriles. Flores succedanei. Sepalum dorsale elliptico-oblongum, obtusum, concavum, 5nervium, c. 0.74 cm. longum, 0.35 cm. latum. Sepala lateralia ad basin pedis gynostemii tantum decurrentia, oblique elliptica, anguste obtusa, concava, dorso carinata, 5nervia, c. 0.675 cm. longa, 0.43 cm. lata. Petala oblique ovalia, obtusa, basi unguiculato contracta, concava, 3nervia, c. 0.67 cm. longa, 0.33 cm. lata. Labellum basi lata tenui apici pedis gynostemii crassiori obtusangule exciso insertum, immobile, 3lobum, ante medium vix saccato-concavum, obtusangule rotundato-incurvum, basi 5nervium, costa valida longitudinali basi humili deinde valde rotundato-elevata valde lateraliter compressa velutino-papillosa apice libera supra basin usque ultra medium lobi intermedii producta, costula brevi longitudinali glabra utrinque ad basin lobi intermedii, explanatum late cuneatum, usque ad apicem lobi intermedii c. 0.4 cm. longum, 0.65 cm. latum; lobi laterales magni, erecti, obtusangule falcato-trianguli, obtusi, marginibus recurvi; lobus intermedius porrectus, semiorbicularis, subplanus, c. 0.1 cm. longus, 0.2 cm. latus. Gynostemium longiusculum, subconicum, dorso convexum, c. 0.3 cm. longum, apice truncatum, clinandrio concavo. Anthera cucullata, ambitu quadrangula, apice late rotundato-biloba, c. 0.15 cm. lata. Pollinia 4, inaequalia, in corpuscula 2 subglobosa unita, posteriora quam anteriora c. 0.06 cm. diam. minora, stipite late oblongo, apicem versus paulo dilatato, cum glandula c. 0.08 cm. longo. Stigma majusculum, profundum. Pes gynostemii cum ovario angulum obtusum faciens, vix sigmoideus, oblongus, apicem versus dilatatus et obtusangule excisus, basi concavus, vix papillosus, c. 0.26 cm. longus. Ovarium 6sulcatum, c. 0.4 cm. longum. Capsula teres, 6costata, c. 4.5 cm. longa, pedicello c. 0.3 cm. longo.

Java: Priangan, Bandoeng,. Kawah Kamodjan, in c. 1500 m ü.d. M., auf dünnen Zweigen im Urwalde. (R. C. Bakhuizen van

den Brink, bl. im Januar 1916; W. Docters van Leeuwen n. 2424, bl. und fr. im September 1916).

Eine kleine, distinkte Art der Sektion *Orsidice* mit kurzen Sepalen und Petalen. Die Lippe ist kaum sackig, nur stumpfwinkelig vertieft, und erinnert in dieser Hinsicht an *Th. comans* J. J. S., das jedoch der Sektion *Dendrocolla* angehört.

Nach Angabe des Sammlers sind die Blüten hellrosenrot mit dunklen Fleckchen.

Beschreibung nach Herbar und in Alkohol konservierten Blüten.

Thrixspermum roseum J. J. S.

Stengel kurz, c. 2—2.5 cm lang. Blätter lanzettlich linear, mehr oder weniger ungleich 2zähnig, sicco c. 2.7—5 cm lang, 0.27—0.6 cm breit: Scheiden länger als die Internodien, der untere Teil röhrig, nach oben zusammengelegt rinnig. Blütenstände vielblütig, lange fortblühend; Pedunculus fadenförmig, mit c. 2 röhrigen Schaftblättern, c. 2.6—8.3 cm lang; Rachis viel dicker, zickzackig, mehr als 2.4 cm lang werdend, mit den Brakteen c. 0.325—0.37 cm breit. Brakteen 2zeilig, die Rachis halbumfassend, dreieckig, spitz, konkav, stark gekielt, c. 0.175 cm lang. Blüten in Zwischenräumen geöffnet. Unpaares Sepalum länglich elliptisch, stumpf, konkav, c. 0.74 cm lang, 0.35 cm breit. Paarige Sepalen nur am unteren Teil des Säulenfusses herablaufend, schief elliptisch, schmal stumpf, konkav, aussen gekielt, c. 0.675 cm lang, 0.43 cm breit. Petalen oval mit nagelförmig zusammengezogener Basis, stumpf, konkav, c. 0.67 cm lang, 0.33 cm breit. Lippe dem Säulenfuss mit breiter Basis unbeweglich inseriert, 3lappig, unterhalb der Mitte stumpfwinkelig kaum sackig vertieft, 3lappig, innen über der Basis mit einem nach vorne stark erhabenen und abgerundeten, stark seitlich zusammengedrückten, nicht bis zur Lippenspitze fortlaufenden, an der Spitze freien, dicht papillösen Längskiel und beiderseits unterhalb der Basis des Mittellappens mit einem kurzen, kahlen Längsrippchen, ausgespreizt breit keilig, bis an die Spitze des Mittellappens c. 0.4 cm lang, 0.65 cm breit; Seitenlappen gross, aufrecht, sichelig dreieckig, stumpf, mit zurückgebogenen Rändern; Mittellappen halbrund, ziemlich flach, c. 0.1 cm lang, 0.2 cm

breit. Säule ziemlich lang, etwas kegelig, c. 0.3 cm lang. Anthere im Umriss vierkant, an der Spitze abgerundet 2lappig, 0.15 cm breit. Pollinien 4, ungleich gross, zu 2 ungefähr kugeligen Körperchen vereinigt, die vorderen am grössten, auf einem breit länglichen, gegen die Spitze etwas verbreiterten Stielchen. Säulenfuss mit dem Ovarium einen stumpfen Winkel bildend, länglich, gegen die Spitze verbreitert und stumpfwinkelig ausgeschnitten, c. 0.26 cm lang. Ovarium 6furchig, 0 4 cm lang. Frucht zylindrisch, 6rippig, c. 4.5 cm lang; Stielchen c. 0.3 cm lang.

Thrixspermum batuense J. J. S. in Bull. Dép. Agric. Ind. Néerl. No. XXII (1909), 47.

var. **javanicum** J. J. S. n. var.

Caulis compressus, c. 8 cm. longus, internodiis c. 0.7 – 0.8 cm. longis, radicibus elongatis, tenuibus. Folia patentia, oblonga, obtusissima, apice leviter inaequaliter obtuse 2loba, basi contracta et arcte conduplicata, dorso carinata, sicco coriacea, c. 4.25 — 4.5 cm. longa, 1.4 — 1.45 cm. lata; vaginae tubulosae, valde lateraliter compressae, apice conduplicatae, carinatae, apice valde obliquae, sicco prominenter nervosae et transverse rugulosae, internodia superantes, sicco c. 0.5 cm. latae. Inflorescentiae vaginas perforantes, erectae, folia multo superantes, apice dense multiflorae, pedunculo tereti, c. 16 cm. longo, vaginulis c. 4 brevibus tubulosis donato, rachide brevi, quam pedunculum crassiore, c. 1.2 cm. vel plus longa. Bracteae quaquaversae, patentes, e basi triangula subulatae, concavae, c. 0.3 – 0.4 cm. longae. Flores intervallis aperti, parvi. Sepalum dorsale oblongo-ellipticum, subobtusum, qasi paulo contractum, concavum, 3nervium, c. 0.63 cm. longum, 0.25 cm. latum. Sepala lateralia valde obliqua, oblonga, margine antico dimidio inferiore in lobum conspicuum oblique rotundato-triangulum dilatata, acuta, supra basin 5nervia, c. 0.65 cm. longa, 0.375 cm. lata. Petala oblique suboblonga, basi unguiculato-contracta, apice obtusa, concava, 3nervia, c. 0.53 cm. longa, 0.15 cm. lata. Labellum basi lata pedi gynostemii insertum, calcaratum, 3lobum, cum pede gynostemii oblique infundibuliforme, leviter recurvum, intus infra basin lobi intermedii callo instructum, totum c. 0.7 cm. longum, explanatum (absque calcari) semilunatum, totum 0.63 cm. latum, usque ad apicem lobi intermedii (cum

calcari) 0.57 cm. longum; calcar saccatum, breve, deorsum spectans, dorso pedem gynostemii continuum, conicum, obtusum; lobi laterales erecti, e basi late triangula angustati, falcati, anguste obtusi; lobus intermedius abbreviatus, retusus, subtus in callum obtusum productus. Gynostemium curvulum, dorso convexum, subtus concavum, apice obtusum retusumque, absque anthera c. 0.17 cm. longum, auriculis in denticulum productis. Stigma profunde excavatum, quadrangulum, superne angustatum. Pes gynostemii cum ovario angulum subrectum faciens, late quadrangulus, apicem versus dilatatus, concavus. Ovarium 6sulcatum, c. 0.5 cm. longum. Fructus immaturus elongatus.

Java: Süd-Priangan, Rawah Apoe bei Kali Poetjang, in 10 m ü. d. M. (C. A. Backer n. 4475, bl. im September 1912).

Diese Pflanze sieht *Th. batuense* J. J. S. von den Batoe-Inseln, westlich von Sumatra, von dem ich nur getrocknetes Material gesehen habe, so ähnlich, dass sie vielleicht kaum als Varietät zu handhaben sein wird. Sie ist vom Typ hauptsächlich verschieden durch kleinere Blüten, kürzere Sepalen und kürzere Seitenlappen der Lippe.

Nach Angabe sind die Blüten orangegelb.

Beschreibung nach Herbar und einer in Alkohol konservierten Blüte.

Thrixspermum batuense J. J. S. var. ***javanicum*** J. J. S.

Stengel zusammengedrückt, c. 8 cm lang, die Internodien c. 0.7—0.8 cm lang. Blätter abstehend, länglich, sehr stumpf, und etwas ungleich stumpf 2lappig, am Grunde zusammengezogen and knapp zusammengelegt, unten gekielt, sicco ledrig, c. 4.25—4.5 cm lang, 1.4 cm breit; Scheiden röhrig, stark seitlich zusammengedrückt, an der Spitze zusammengelegt und sehr schief, gekielt, sicco runzelig, länger als die Internodien, 0.5 cm breit. Blütenstände die Scheiden durchbohrend, aufrecht, viel länger als die Blätter, an der Spitze dicht vielblütig; Pedunculus stielrund, c. 16 cm lang, mit c. 4 kurzen, röhrigen Schaftblättern; Rachis kurz, dicker als der Pedunculus, 1.2 cm oder mehr lang. Brakteen allseitswendig, abstehend, aus dreieckiger

Basis pfriemlich, konkav, c. 0.3—0.4 cm lang. Blüten in Zwischenräumen blühend, klein. Unpaares Sepalum länglich elliptisch, stumpflich, konkav, c. 0.63 cm lang, 0.25 cm breit. Paarige Sepalen sehr schief, länglich, die einander zugewandten Ränder in der unteren Hälfte zu einem bedeutenden, schief abgerundet dreieckigen Läppchen verbreitert, spitz. Petalen schief länglich, stumpf, am Grunde nagelförmig zusammengezogen, konkav, c. 0.53 cm lang, 0.15 cm breit. Lippe mit breiter Basis inseriert, 3lappig, mit dem Säulenfuss schief trichterig, schwach zurückgebogen, innen unterhalb der Basis des Mittellappens mit einer Schwiele, im ganzen 0.7 cm lang, ausgespreizt ohne den Sporn halbmondförmig, 0.63 cm breit, bis zur Spitze des Mittellappens mit dem Sporn 0.57 cm lang; Sporn abwärts gewandt, in die Verlängerung des Säulenfusses, sackig, kurz, kegelig, stumpf; Seitenlappen aufrecht, aus breit dreieckiger Basis verschmälert, sichelig, schmal stumpf; Mittellappen sehr kurz, eingedrückt, unten in einen stumpfen Callus vorgezogen. Säule schwach gebogen, mit konvexem Rücken, unten koncav, mit stumpfer, eingedrückter Spitze, ohne Anthere 0.17 cm lang; Öhrchen mit einem Zähnchen. Narbe tief, viereckig, nach oben verschmälert. Säulenfuss mit dem Ovarium einen nahezu rechten Winkel bildend, breit viereckig, gegen die Spitze verbreitert, konkav. Ovarium 6furchig, 0.5 cm lang. Junge Frucht verlängert.

Saccolabiopsis J. J. S. n. gen.

Sepala petalaque libera, subsimilia, oblonga. Labellum ad basin gynostemii insertum, immobile, calcaratum, subtrilobum, concavum, tenuisculum, ecallosum, lobis lateralibus brevissimis, latis, vix a lobo medio porrecto separatis. Gynostemium breve, apodum. Anthera cucullata, apice triangulo-producta. Pollinia 4, valde inaequalia, stipite breviusculo, spathulato, glandula mediocri. Stigma magnum.

Planta parva. Caulis brevis, paucifolius. Folia lanceolata, bilobula; vaginae breves. Inflorescentiae 2 vaginas perforantes, interdum pauciramosae, multiflorae. Flores parvi, quaquaversi, plures dies viriditatem conservant.

*****Saccolabiopsis Bakhuizenii*** J. J. S. n. sp.

Planta pusilla. Caulis abbreviatus, c. 4folius, radicibus subte-

retibus, subtus tantum applanatis. Folia patentia, basi semitorta, oblique lanceolata, oblique obtuse biloba, basi angustata et conduplicata, supra canaliculata et utroque latere convexa, subtus carinata et utroque latere concava, carnosa, dilute viridia, facie (superiore vel inferiore) soli exposita manifeste rubro-suffusa, c. 1.6 — 3.6 cm. longa, 0.57 — 1.13 cm. lata; vaginae brevissimae, tubulosae, lateraliter compressae, pallide virides, haud raro purpureo-maculatae, internodia superantes, c. 0.25 cm. longae. Inflorescentiae vaginas 2 perforantes, decurvae, interdum parcissime ramosae, multiflorae, diu florentes, pedunculo patente, tenui, apicem versus incrassato et angulato, dilute viridi, purpureo-maculato, c. 1.25 — 1.4 cm. longo, vaginulis c. 3 tubulosis carinatis donato, rachide crassa, manifeste obtuse interrupto-angulata, dilute viridi, valde purpureo-suffusa, c. 1.7 — 3.8 cm. et plus longa, 0.17 — 0.2 cm. diam. Bracteae ovario adpressae, lineari-subulatae, valde concavae, dilute virides, purpureo-suffusae, c. 0.18 cm. longae. Flores quaquaversi, patentissimi, incurvi, minimi, plures dies viriditatem conservantes, bene aperti, inodori, c. 0.3 cm. longi et lati, sepalis petalisque pallide virescentibus, deinde flavescentibus, saepe plus minusve pallide violaceo-suffusis. Sepalum dorsale oblongo-obovatum, obtusum, superne leviter irregulariterm arginatum, leviter concavum, costa media dorso obtuse incrassata, bene 0.2 cm. longum, 0.08 cm. latum. Sepala lateralia oblique subelliptico-oblonga, subacuta, basi paulo contracta, superne vix irregulariter marginata, obtusangule concava, dorso carinata, carina apicem non attingente, c. 0.2 cm. longa, 0.08 cm. lata. Petala oblique obovato-oblonga, obtusa, apice irregulariter marginata, obtusangule concava, apice incurvula, costa media dorso incrassata, c. 0.175 cm. longa, bene 0.075 cm. lata. Labellum immobile, porrectum, calcaratum, subtrilobum, basi cum ovario angulum acutum faciens, supra visum ovatum, lamina a calcari sinu rotundato separata vel subtus inter laminam et calcar convexo-tumidum, macula purpurea inter lobos, usque ad apicem ovarii c. 0.175 cm. longum, 0.14 cm. latum; lobi laterales ad faucem calcaris erecti, divergentes, brevissimi, latissimi, truncati, antice obtusanguli et vix a lobo medio sejuncti, postice rotundati, concavi, albi; lobus intermedius porrectus, late triangulus, subobtusus, apice incurvulus et subtus leviter gibbosus, leviter concavus et basi incrassationibus 2 inconspicuis convexis sulco separatis instructus, subtus conve-

xus, carnosulus, pallide viridis, c. 0.06 cm. longus; calcar deorsum spectans, rectum, oblique oblongum, lateraliter compressum, obtusum, basi ampliatum, pallide flavescens. Gynostemium breve, crassiusculum, dilute viride, cum anthera c. 0.125 cm. longum, apice late rotundato-triangulo, auriculis latis, obtusis. Anthera majuscula, cucullata, e basi transverse oblonga pallide flavescenti in appendicem conspicuam aequilatam triangulam apice recurvulam albidam producta, c. 0.06 cm. lata, thecis globosis. Pollinia 4, valde inaequalia, libera, pallide flava, majora pyriformia, minora obovata compressa, stipite spathulato, albo, glandula mediocri, tota vix 0.05 cm. longa. Rostellum incurvum, postice breviter productum. Stigma magnum, faciem inferiorem gynostemii fere omnino occupans, subquadrangulum, margine inferiore gibbo brevi rotundato convexo instructum. Ovarium 6sulcatum, dilute viride, c. 0.2 cm. longum. Capsula patentissima, brevissime pedicellata, manifeste 6costata, viridis, violaceo-maculata.

Java: Priangan, an der Tjitjoeroek bei der Mündung der Tjisokan in 800 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im April 1917).

Anfangs glaubte ich diese Pflanze in die Gattung *Saccolabium* unterbringen zu können. Durch das Vorhandensein 4 sehr ungleich grosser Pollinien und die viel dünnere Textur der Lippe habe ch mich veranlasst gesehen eine neue Gattung auf sie zu gründen. iVerzweigte Blütenstände sind bis jetzt auch noch nicht bei *Saccolabium* nachgewiesen worden.

Bemerkenswert ist es, dass die dem Lichte zugekehrte Seite der Blätter, gleichviel ob es die Unter- oder die Oberseite ist, sich intensiv rot färbt.

Saccolabiopsis J. J. S.

Sepalen und Petalen frei, ziemlich gleich, länglich. Lippe am Grunde der Säule inseriert, unbeweglich, gespornt, schwach dreilappig, konkav, ziemlich dünn, ohne eigentliche Schwielen, mit sehr kurzen, breiten, kaum vom Mittellappen getrennten Seitenlappen. Säule kurz, fusslos. Anthere kappig, an der Spitze dreieckig vorgezogen. Pollinien 4, sehr ungleich gross, auf einem ziemlich kurzen, spateligen Stielchen, mit mässiger Klebmasse. Narbe gross.

Kleine Pflanze. Stengel kurz, wenigblättrig. Blätter lanzettlich, an der Spitze 2lappig, mit kurzer Scheide. Blütenstände 2 Scheiden durchbohrend, bisweilen etwas verzweigt, vielblütig. Blüten klein, sich einige Tage haltend.

Saccolabiopsis Bakhuizenii J. J. S.

Kleine Pflanze. Stengel sehr kurz. Blätter c. 4, abstehend, schief lanzettlich, ungleich stumpf 2lappig, oben konvex mit einer Längsrinne, unten gekielt, fleischig, die der Sonne ausgestellte Seite rot gefärbt, c. 1.6—3.6 cm lang, 0.57—1.13 cm breit; Scheiden sehr kurz, röhrig, seitlich zusammengedrückt, blassgrün, nicht selten rot gefleckt, c. 0.25 cm lang. Blütenstände 2 Scheiden durchbohrend, abwärts gebogen, bisweilen verzweigt, vielblütig; Pedunculus dünn, c. 1.25—1.4 cm lang, mit c. 3 röhrigen, gekielten Schaftblättern; Rachis dick, stark kantig, purpurn angelaufen, c. 1.7—3.8 cm lang, 0.17—0.2 cm dick. Brakteen linear pfriemlich, stark konkav, c. 0.18 cm lang. Blüten allseitswendig, weit abstehend, eingebogen, sehr klein, sich mehrere Tage haltend, geruchlos, blassgrünlich, nachher gelblich, nicht selten blasspurpurn angelaufen, c. 0.3 cm lang und breit. Unpaares Sepalum und Petalen verkehrt eirund länglich, stumpf, nach oben etwas unregelmässig berandet, konkav, mit aussen verdickter Mittelrippe, c. 0.2 und 0.175 cm lang, 0.08 cm breit. Paarige Sepalen länglich, spitzlich, konkav, gekielt, 0.2 cm lang, 0.08 cm breit. Lippe unbeweglich, von oben gesehen eirund, konkav, innen mit 2 purpurnen Flecken; Seitenlappen aufrecht am Sporneingang, divergierend, sehr kurz, breit, abgestutzt, vorn kaum vom Mittellappen getrennt, weiss; Mittellappen vorgestreckt, breit dreieckig, stumpflich, schwach konkav, unten konvex, fast ohne Verdickungen, blassgrün, c. 0.06 cm lang; Sporn abwärts gewandt, mit dem Ovarium einen spitzen Winkel bildend, gerade, länglich, seitlich zusammengedrückt, stumpf, am Eingang erweitert, gelblich, bis zum Ovarium c. 0.175 cm lang. Säule kurz, ziemlich dick, hellgrün, c. 0.125 cm lang, mit breiter Spitze und breiten, stumpfen Öhrchen. Anthere ziemlich gross, kappig, gelblich, an der Spitze mit einem grossen, dreieckigen, an der Spitze etwas zurückgebogenen, weisslichen Anhängsel, c. 0.06 cm breit, die Theken kugelig. Pollinien 4, sehr ungleich, blassgelb, die grössten birnförmig, die kleinsten verkehrt eirund und

zusammengedrückt, auf einem spateligen Stielchen, zusammen kaum 0.05 cm lang. Rostellum eingebogen, nach hinten etwas vorgezogen. Narbe gross, ungefähr viereckig, am unteren Rande mit einer kurzen, abgerundeten Verdickung. Ovarium 6furchig, 0.2 cm lang.

***Saccolabium galbinum** J. J. S. n. sp.

Planta parva. Caulis simplex, basi radicans, c. 2.75 cm. longus, internodiis c. 0.3 — 0.325 cm. longis. Folia c. 6, patentissima, lanceolata, apicem versus sensim angustata, apice inaequaliter acute vel subacute bidentata cum mucrone conico dentem longiorem subaequante interposito, basi semiamplexicaulia, supra obtusangule canaliculata cum sulco longitudinali, subtus obtusangule convexa et apice obtuse subcarinata, crasse carnosa sed non rigida, utrinque nitide atroviridia, c. 2.1 — 2.6 cm. longa, 0.625 — 0.7 cm. lata; vaginae tubulosae, sectione transversa ovales, opaco-virides, internodia superantes, c. 0.24 cm. latae. Inflorescentiae vaginas 2 perforantes, patentissimae, simplices, laxe multiflorae, diu florentes, pedunculo filiformi, c. 1.8 cm. longo, vaginulis c. 1 — 2 brevibus tubulosis donato, rachide pedunculo crassiore, angulata cum lateribus concavis, nitida, dilute olivacea, 3 cm. superante, internodiis c. 0.15 — 0.2 cm. longis. Bracteae parvae, ovario adpressae, triangulae, acutae vel subacutae, concavae, virides, c. 0.07 cm. longae. Flores parvi, quaquaversi, succedanei, patentes, paulum aperti, lateraliter compressi, galbini, deinde oleoso-ochrascentes, apice sepalorum petalorumque dilute flavi, carnosuli, per c. 2 dies florentes, c. 0.46 cm. longi, 0.225 cm. lati. Sepalum dorsale horizontale, in c. $^1/_3$ supra basin obtusangule incurvum, subovali-quadrangulum, apice triangulo obtusum, basi vix contractum, concavulum, dorso convexum, c. 0.25 cm. longum, 0.17 cm. latum. Sepala lateralia porrecta, parallela, labello adpressa, oblique obovato-quadrangula, obtusissima, concava, extus convexa, c. 0.26 cm. longa, 0.2 cm. lata. Petala minora, porrecta, parallela, oblique ovalia, obtusissima, concavula, dorso valde carinata, c. 0.16 cm. longa, 0.125 cm. lata. Labellum immobile, cum ovario angulum subrectum faciens, rectum, angustum, excavatum, subtrilobum, lateraliter compressum, subtus convexum, supra visum ambitu lineari-oblongum, ochraceum, glabrum, totum c. 0.3 cm., usque ad apicem calli lobi intermedii 0.27 cm. longum, 0.1 cm. latum, lobis lateralibus brevissimis, basi latissimis, leviter obtusangulis, carnosulis, canalicula angusta in calcar decurrente separatis, marginibus anticis ante basin lobi intermedii lamella transversa rotundato-excisa conjunctis, lobo intermedio a basi labelli valde remoto, minimo, transverse calliformi, obtuso, subtus in callum majorem porrectum conicum obtusum dilute flavum auctum, calcari apicali, dorsum labelli continuo, deorsum spectante, cum lobo intermedio angulum obtusum faciente, brevi, conico, obtuso, retuso. Gynostemium inclinatum, cum ovario angulum obtusum faciens, rectum, bene semiteres, obtusum, ochraceum, apice pallide flavum, absque anthera fere 0.1 cm. longum, clinandrio transverse ovali, leviter concavo. Anthera reniformis, apice brevissime obtuse producta, convexa, membranacea, alba, inter thecas vix flavescens, c. 0.08 cm. lata. Pollinia 2, globosa, esulcata, flavescentia, nitida, cum stipite brevi lata orbiculari-rhombeo basi brevissime spathulato-contracto convexo albo et glandula parva suborbiculari c. 0.08 cm. longa. Rostellum breve, bidentatum. Stigma magnum, faciem inferiorem gynostemii fere omnino occupans, alte excavatum, suborbiculare. Ovarium rectum, etortum, 6sulcatum, apice obliquum, dilute viride, furfuraceo-punctatum, c. 0.3 cm. longum.

Java: Priangan, Pasir Angin (Tjadas Malang) bei Tjibeber, in c. 1100 m ü. d. M. (W. F. Winckel n. 339, bl. im September 1917).

Die Art ist wohl am besten in die Sektion *Rhopalorhachis* unterzubringen. Eine nahe Verwandte kenne ich nicht.

Bemerkenswert sind die aussen gekielten Petalen, der weit nach vorne gerückte Mittellappen und der in die Verlängerung der Lippe stehende Sporn.

Saccolabium galbinum J. J. S.

Kleine Pflanze. Stengel unverzweigt, am Grunde wurzelnd, c. 2.75 cm. lang, die Internodien 0.3 – 0.325 cm lang. Blätter c. 6, weit abstehend, lanzettlich, gegen die Spitze verschmälert, ungleich spitz 2zähnig und mit einem kegeligen Spitzchen, halbstengelumfassend, oben stumpfwinkelig rinnig, unten stumpfwinkelig konvex und an der Spitze etwas gekielt, dick fleischig, beiderseits

glänzend dunkelgrün, c. 2.1 – 2.6 cm lang, 0.625 – 0.7 cm breit; Scheiden röhrig, auf dem Querschnitt oval, mattgrün, länger als die Internodien, 0.24 cm. breit. Blütenstände 2 Scheiden durchbohrend, weit abstehend, unverzweigt, locker vielblütig, lange fortblühend; Pedumculus fadenförmig, c. 1.8 cm lang, mit 1 – 2 kurzen, röhrigen Schaftblättern; Rachis etwas dicker, kantig mit konkaven Seiten, glänzend, hellolivengrün, mehr als 3 cm lang. Brakteen klein, anliegend, dreieckig, spitz oder spitzlich, konkav, grün, c. 0.07 cm lang. Blüten klein, allseitswendig, allmählich blühend, wenig geöffnet, seitlich zusammengedrückt, grünlich gelb, nachher ölig gelb, die Spitze der Sepalen und Petalen hellgelb, etwas fleischig, sich nahezu 2 Tage haltend, c. 0.46 cm lang, 0.225 cm breit. Unpaares Sepalum horizontal, in c. $^1/_3$ über der Basis stumpfwinkelig eingebogen, ungefähr oval viereckig, an der Spitze dreieckig stumpf, an der Basis kaum etwas zusammengezogen, schwach konkav, c. 0.25 cm lang, 0.17 cm breit. Paarige Sepalen vorgestreckt, parallel, der Lippe angedrückt, schief verkehrt eirund viereckig, sehr stumpf, konkav, c. 0.26 cm lang, 0.2 cm breit. Petalen kleiner, vorgestreckt, parallel, schief oval, sehr stumpf, schwach konkav, aussen stark gekielt, c. 0.16 cm lang, 0.125 cm breit. Lippe unbeweglich, mit dem Ovarium einen nahezu rechten Winkel bildend, gerade, schmal ausgehöhlt, von der Seite zusammengedrückt, schwach dreilappig, unten konvex, von oben gesehen im Umriss linear länglich, kahl, ockergelblich, im ganzen c. 0.3 cm, bis zur Spitze der Schwiele unterhalb des Mittellappens 0.27 cm lang, 0.1 cm breit; Seitenlappen aufrecht, sehr kurz, mit sehr breiter Basis, schwach stumpfwinkelig, etwas fleischig, von einer schmalen, in den Sporn hinablaufenden Längsrinne getrennt, die Vorderränder von einer rund ausgeschnittenen Querlamelle verbunden; Mittellappen weit nach vorne gerückt, sehr klein, quer, callusförmig, stumpf, unten mit einem grösseren, kegeligen, stumpfen, hellgelben Callus; Sporn die Spitze der Lippe bildend, abwärts gewandt, mit dem Mittellappen einen stumpfen Winkel darstellend, kurz, kegelig, stumpf, eingedrückt. Säule übergeneigt, mit dem Ovarium einen stumpfen Winkel bildend, gerade, mehr als halbzylindrisch, stumpf, ockergelblich, an der Spitze blassgelb, ohne Anthere fast 0.1 cm lang; Clinandrium quer oval, schwach konkav. Anthere nierenförmig, an der Spitze sehr kurz stumpf vorgezogen, dünn, weiss, 0.08

cm breit. Pollinien 2, kugelig, ohne Furche, gelblich, glänzend, mit dem breiten, kurzen, rundlich rautenförmigen, an der Basis sehr kurz spatelig zusammengezogenen, konvexen, weissen Stielchen und der kleinen, rundlichen Klebmasse c. 0.08 cm lang. Rostellum kurz, 2zähnig. Narbe gross, nahezu die ganze Unterseite der Säule bedeckend, tief ausgehöhlt, rundlich. Ovarium gerade, nicht gedreht, 6furchig, mit schiefer Spitze, hellgrün, kleiig punktiert, c. 0.3 cm. lang.

Luisia antennifera Bl. Mus. Bot. Lugd. Bat. I (1849), 64; Lndl. Fol. Orch. Luisia (1853), 1; Miq. Fl. Ind. Bat. III (1855), 686, 741; Rchb. f. Xen. Orch. I (1858), 205, t. 78 II, fig. 4—7; in Walp. Ann. VI (1861), 619; Hook. f. Fl. Br. Ind. VI (1890), 25; Ridl. Mat. Fl. Mal. Pen. I (1907), 148.

Stengel verlängert, später herabhängend, stielrund, steif, dunkelgrün, mehr oder weniger schmutzig violett angelaufen, nur am Grunde wurzelnd, bis c. 80 cm lang, 0.4 cm dick, die Internodien 3.75—4 cm lang. Blätter weit abstehend, gerade, drehrund, oben mit einer schwachen Längsfurche, an der Spitze schief und abgebrochen in ein deutliches Spitzchen zusammengezogen, fleischig, matt dunkelgraugrün, stark grauviolett überlaufen und gefleckt, c. 16 cm lang, 0.3 cm dick; Scheiden röhrig, zylindrisch, den Internodien gleich lang, matt dunkelgrün, schwarzviolett überlaufen und gefleckt, c. 0.4 cm im Durchmesser. Blütenstände die Scheide hinten am Grunde durchbohrend, dem Stengel angedrückt, kurz, gerade, dicht, ziemlich vielblütig; Pedunculus kurz, nach oben hin allmählich verdickt, dunkelgrün, c. 0.6 cm lang, mit c. 3 kurzen, röhrigen Scheiden; Rachis dick, dunkelgrün, c. 1.5 cm. und mehr lang, 0.45—0.5 cm dick. Brakteen abstehend, die Rachis halb umfassend, kurz und sehr breit dreieckig, stumpf, konkav. Blüten allseitswendig, mehrere zugleicherzeit blühend, auf den Fruchtknoten eingebogen, mittelgross, fleischig, die Sepalen divergierend. Unpaares Sepalum über der Säule stehend, oval mit breiter Basis, sehr stumpf, sehr konkav, 5nervig, c. 0.75 cm lang, 0.43 cm breit. Paarige Sepalen schief kahnförmig, sehr konkav, schief elliptisch, von oben gesehen spitz, aussen stark gekielt, unausgespreizt c. 0.75 cm lang, 0.4 cm breit. Petalen viel länger als die Sepalen, vorgestreckt, bogig, etwas schief linear, an der Spitze kaum etwas verbreitert, schmal stumpf, gegen die Basis etwas verbreitert, innen konvex, aussen konkav, 3nervig, c. 1.7 cm lang, an der Basis 0.15 cm, in der Mitte 0.1 cm breit. Lippe dem Fruchtknoten parallel, ziemlich lang, fleischig, 3lappig, im ganzen c. 0.725 cm. lang; Hypochyl durch eine schwach gebogene Querfurche vom Epichyl (Mittellappen) getrennt, im Umriss ungefähr vierkant, am Grunde in die kleinen, aufrechten, der Säule angedrückten, schief dreieckigen, stumpfen oder mehr oder weniger abgerundeten, am hinteren Rande abgerundeten, aussen stumpfwinkelig konvexen, innen konkaven, dicken Seitenlappen verbreitert. zwischen den Seitenlappen am Grunde mit einer ungefähr fünfeckigen Queraushöhlung mit verdicktem vorderem Rande, der vordere Teil schwach konvex mit einem schmalen, konvexen Längsstreifen, an der Spitze durch Furchen etwas netzförmig runzelig, unten konvex, c. 0.35 cm lang, über die nicht ausgespreizten Seitenlappen 0.36 cm breit; Epichyl (Mittellappen) durch zurückgebogene Seitenränder stark stumpfwinkelig konvex, unten konkav, im Umriss breit eirund, am Grunde beiderseits abgerundet verbreitert, gegen die Spitze verschmälert und beiderseits mit einem kurzen, breiten Kerbzahn, an der Spitze abgestutzt, mit c. 7 – 9 unregelmässigen Längsfurchen und durch unregelmässige Querfurchen netzförmig runzelig, c. 0.4 cm lang, 0.46 cm breit. Säule in die Verlängerung der eingebogenen Ovariumspitze, gerade, ziemlich dick, länglich, mit konvexem Rücken, mit vorgezogener stumpfer Spitze, ohne Anthere 0.3 cm lang; Clinandrium konkav. Anthere quer oval, an der Spitze abgestutzt und kaum zurückgebogen, mit einer Längsrinne zwischen den Theken, daher zweiknöpfig, gut 0.2 cm breit. Pollinien 2, etwas zusammengedrückt, etwas schiefeckig rundlich, hinten mit einer linearen Längsaushöhlung, auf einem kurzen, breiten Stielchen mit nahezu gleich grosser Klebmasse. Rostellum kurz, 2teilig. Narbe rundlich. Fruchtknoten an der Spitze eingebogen, scharf 3rippig, 6furchig, mit dem gedrehten Stielchen c. 1 cm lang. Frucht scharf dreikantig, stumpf, gegen die Basis verschmälert und spitz, kurz gestielt.

Java: Priangan, Tjisokan bei Tjibeber, in c. 1000 m ü. d. M. (W. F. Winckel, bl. im Oktober 1916, kult. unter n. 245). Geogr. Verbr. Borneo, Sumatra, Malaka.

Nach den Notizen von Herrn R. C. Bakhuizen van den Brink ist der Stengel herabhängend, c. 80 cm lang und nur am Grunde bewurzelt. Die Sepalen und Petalen sind grünweisslich und die Lippe und Säule sammetartig dunkelviolett.

In Rumphia wurde die Pflanze nicht von Blume beschrieben; er erwähnte dort nur den Namen.

Beschreibung nach einem lebenden Zweigstück und einigen in Alkohol konservierten Blüten.

Die 4 javanischen Arten sind wie folgt auseinander zu halten.

1. Petalen breit, ungefähr schief oval, nicht oder kaum länger als das unpaare Sepalum. Mittellappen der Lippe quer, ungefähr nierenförmig. . . . . *L. latipetala* J. J. S.
Petalen schmal, deutlich länger als die Sepalen. . . . 2.
2. Petalen schief spatelig. Mittellappen der Lippe ungefähr herzförmig . . . . *L. taurina* J. J. S.
Petalen linear. . . . . 3.
3. Petalen c. 1.7 cm lang. Mittellappen der Lippe ungefähr eirund. . . . . *L. antennifera* Bl.
Petalen c. 1 cm lang. Mittellappen quer, nierenförmig. *L. javanica* J. J. S.

***Trichoglottis Winkleri** J. J. S. in Engl. Bot. Jahrb. XLVIII (1912), 105.

var. **minor** J. J. S. n. var.

Caulis elongatus, dependens, pauciramosus, fere tota longitudine radicans, tenuis, leviter flexuosus, sectione transversa ellipticus, dilute viridis, c. 45 cm. longus, internodiis c. 1—1.2 cm. longis, a basi apicem versus incrassatis, apice obliquo ad c. 0.175 cm. latis, radicibus supra nodos supra inflorescentiam ortis, solitariis. Folia patentia, semitorta, lineari-lanceolata, apice contracta, acuta, novella longe et lateraliter compresse mucronata, supra in utraque parte canaliculae longitudinalis convexa, subtus concava et carinata, rugulosa, coriacea, dilute griseo-viridia, novella purpureo-suffusa et maculata et costa media purpurea, opaca, c. 4.3—6.6 cm. longa, 0.6—0.7 cm. lata; vaginae tubulosae, sectione transversa ellipticae, rugulosae, internodia superantes, opaco-virides, c. 0.2 cm. latae vel paulo latiores. Inflorescentiae 2 vaginas perforantes, 2—3 superimpositae, succedaneae, abbreviatae, 1florae,

pedunculo vix 0.15 cm. longo, nonnullis vaginulis brevissimis imbricantibus tecto. Bractea adpressa, brevissime et late triangula, obtusa, concava, pallida, ovario multo brevior. Flos parvulus, plane apertus, c. 0.9 cm. latus, 1.2 cm. longus. Sepalum dorsale erectum, apice incurvum, supra medium valde concavum, inexplanatum oblongum, explanatum ellipticum, obtusum, basi leviter contractum, album, medio confluenter purpureo-maculatum, c. 0.55 cm. longum, bene 0.3 cm. latum. Sepala lateralia divergentia, valde oblique subovata, apice angustata, obtusa, dimidiis proximis concava, ceterum convexa cum margine inferne recurvo, ecarinata, alba, striis 3—4 transversis purpureis, bene 0.5 cm. longa, 0.45 cm. lata. Petala patentissima, oblique oblongo-linearia, obtusa, alba, $^3/_5$ partibus inferioribus striis 2 longitudinalibus macularum purpurearum confluentium notata, c. 0.5 cm. longa, 0.13 cm. lata. Labellum porrectum, sigmoideum, calcaratum, 3lobum, album, fascia mediana longitudinali sulphureum, flexu inter lobos laterales valde transverse incrassatum et vix pallide purpureo-punctatum, inexplanatum fere 0.7 cm. longum, ex apice loborum lateralium usque ad apicem calcaris 0.26 cm. metiens; lobi laterales basilares, ad faucem calcaris erecti, margine postico gynostemio (pedi gynostemii) adnati, oblique rotundato-quadranguli, gynostemio bene breviores, extus convexi, intus concavi; lobus intermedius magnus, porrectus, sigmoideus, 3fidus, c. 0.55 cm. longus, ungue carnoso, quadrangulo, intus papilloso et costis 2 longitudinalibus excavationem obtegentibus in lobulum medianum calliformem sursum curvum lateraliter compressum obtusum supra visum oblongo-triangulum c. 0.2 cm. longum decurrentibus et ad basin lobuli intermedii gibbum lateraliter compressum rotundatum papillosum gerentibus, laciniis lateralibus porrectis, lobulum intermedium superantibus, divergentibus, curvatis, semiellipticis, acutis, margine exteriore rotundatis, margine interiore rectis, supra convexis, c. 0.35 cm. longis, 0.175 cm. latis; calcar deorsum spectans, ovario parallelum, breve, latum, incurvulum, a dorso compressum, obtusissimum, sulcis longitudinalibus 4lobulatum, pariete postico lamella magna porrecta lobis lateralibus paulo breviore subquadrangula apice dilatata tuncata et antice in callos 2 parvos nitidos pallide flavescentes incrassata inferius macula longitudinali sordide purpurea notata donatum. Gynostemium breve, recurvum, niveum, basi antice purpureum, usque ad apicem

rostelli c. 0.3 cm. longum, clinandrio magno, curvato, leviter concavo cum costula longitudinali. Anthera magna, cucullata, apice sensim longe triangulo producta, acuta, membranacea, alba, fere 0.3 cm. longa. Pollinia 4, rectangule in stipitem inflexa, paulo inaequalia, in corpuscula 2 globosa unita, pallide flava, cum stipite magno cuneato spathulato superne valde dilatato infundibuliformi-involuto apice rotundato albo et glandula parva c. 0.32 cm. longa. Rostellum angustum, bidentatum. Stigma basilare, lageniforme, basi latiusculum, superne in canaliculam angustam productum. Ovarium rectum, 6sulcatum, pallide flavescens, bene 0.2 cm. longum.

Java: Priangan, Tjisokan bei Tjibeber in c. 750 m ü.d.M. (R. C. Bakhuizen van den Brink, bl. im Dezember 1916, kult. in Hort. W. F. Winckel unter n. 19).

Diese Pflanze ist *T. Winkleri* J. J. S. von Borneo so ähnlich, dass ich, wiewohl sie in allen Teilen kleiner ist, sie als eine Varietät dieser Art ansehen zu müssen glaube. Es mag jedoch betont werden, dass *T. Winkleri* nur nach getrocknetem Material beschrieben wurde, und von den beiden Formen nur ein Exemplar vorlag.

Trichoglottis Winkleri J. J. S. var. **minor** J.J.S.

Stengel verlängert, herabhängend, etwas verzweigt, nahezu der ganzen Länge nach wurzelnd, etwas zickzackig, auf dem Querschnitt elliptisch, hellgrün, c. 45 cm lang, die Internodien c. 1—1.2 cm lang, an der Spitze bis 0.175 cm breit, die Wurzeln einzeln über den Inflorescenzen hervorbrechend. Blätter abstehend, linear lanzettlich, an der Spitze zusammengezogen, spitz, anfangs mit einem Spitzchen, unten gekielt, runzelig, ledrig, graugrün, anfangs mit purpurn gezeichnet, matt, c. 4.2—6.6 cm lang, 0.6—0.7 cm breit; Scheiden röhrig, länger als die Internodien, mattgrün, c. 0.2 cm breit. Blütenstände 2 Scheiden durchbohrend, 2—3 über einander gestellt, sehr kurz, 1blütig. Blüte ziemlich klein, weit geöffnet, c. 0.9 cm breit, 1.2 cm lang. Unpaares Sepalum aufrecht, mit eingebogener Spitze, stark konkav, elliptisch, stumpf, weiss, in der Mitte zusammenfliessend purpurn gefleckt, 0.55 cm lang, 0.3 cm breit. Paarige Sepalen divergierend, sehr schief eirundlich, an der Spitze verschmälert, stumpf, weiss mit 3—4 purpurnen Querstreifen, 0.5 cm lang, 0.45 cm breit. Petalen weit abstehend, schief länglich linear, stumpf, weiss, der untere Teil mit 2 aus purpurnen Flecken bestehenden Längsstreifen, 0.5 cm lang, 0.13 cm breit. Lippe vorgestreckt, Sförmig, gespornt, 3lappig, weiss, der mittlere Teil schwefelgelb, auf der Bucht zwischen den Seitenlappen stark quer verdickt und etwas blasspurpurn punktiert, 0.7 cm lang; Seitenlappen am Grunde der Lippe, aufrecht, mit dem Hinterrand der Säule am Grunde angewachsen, abgerundet viereckig, innen konkav, aussen konvex; Mittellappen gross, vorgestreckt, Sförmig, dreispaltig, 0.55 cm lang, mit fleischigem, viereckigem, innen papillösem und mit 2 eine Aushöhlung überdeckenden, in das callusförmige, aufwärts gebogene, seitlich zusammengedrückte, stumpfe, von oben gesehen dreieckige, 0.2 cm lange Mittelläppchen herablaufenden und an der Basis desselben in ein seitlich zusammengedrücktes, papillöses Höckerchen verdickten Längsleisten versehenem Nagel und das Mittelläppchen überragenden, divergierenden, gebogenen, halbelliptischen, spitzen, am Aussenrande abgerundeten, oben konvexen, 0.35 cm langen Seitenläppchen; Sporn abwärts gewandt, kurz, breit, etwas eingebogen, vom Rücken zusammengedrückt, sehr stumpf, durch Längsfurchen kurz 4lappig, an der Hinterwand innen mit einer grossen, den Seitenlappen fast gleich langen, ungefähr viereckigen, an der Spitze verbreiterten, abgestutzten und vorn in 2 blassgelbe, glänzende Schwielen verdickten, mit einem schmutzig purpurnen Fleck gezeichneten Lamelle. Säule kurz, weiss, an der Basis purpurn, bis zur Rostellumspitze 0.3 cm lang; Clinandrium gross, schwach konkav, mit einer Längsrippe. Anthere gross, kappig, an der Spitze lang dreieckig vorgezogen, spitz, dünn, weiss, 0.3 cm lang. Pollinien 4, eingebogen, etwas ungleich, zu 2 kugeligen Körperchen vereinigt, blassgelb, mit dem grossen, keilig spateligen, nach oben stark verbreiterten, tutenförmig aufgerollten, an der Spitze abgerundeten, weissen Stielchen und der kleinen Klebmasse 0.32 cm lang. Rostellum schmal, 2zähnig. Narbe grundständig, flaschenförmig, an der Basis ziemlich breit, nach oben in eine schmale Rinne auslaufend. Ovarium gerade, 6furchig, blassgelblich, 0.2 cm. lang.

***Trichoglottis maculata** J. J. S. n. sp. — *T. lanceolaria* Bl. var. *maculata* J. J. S. in Fl. Buit. VI, Orch. (1905), 619; Atlas fig. CDLXIV.

Caules numerosi, penduli, flaccidi, ramosi, radicantes, leviter flexuosi, tenues, sectione transversa elliptici, virides, c. 80 — 100 cm. longi, internodiis c. 1.5 — 2.2 cm. longis, 0.13 cm. diam., radicibus quam caulem crassioribus. Folia patentia, basi plerumque semitorta, lineari-lanceolata, sensim acutissime angustata vel saepe infra apicem plus minusve contracta, basi angustata, convexa cum canalicula longitudinali, subtus concavula vel plana cum costa media interdum plus minusve prominula, carnosula, rigidiuscula, nitidule sordide viridia, c. 6.5 — 9.5 cm. longa, 0.85 — 0.5 cm. lata; vaginae tubulosae, internodia fere aequantes, longitudinaliter costulatae, virides. Inflorescentiae c. 3 superimpositae, vaginam dorso perforantes, brevissimae, 1 — 2florae, pedunculo abbreviato, c. 0.16 cm. longo, nonnullis vaginulis brevibus tubulosis donato, rachide valde flexuosa, internodiis c. 0.13 cm. longis. Bracteae parvae, adpressae, late subtriangulae, brevissimae, obtusae. Flores parvi, c. 0.55 – 0.65 cm. lati, sepalis petalisque carnosulis, patentissimis, apice incurvis, pallide flavescentibus vel flavidis, pallide vel obscurius cinnamomee biseriali-maculatis. Sepalum dorsale oblongum, brevissime apiculato-acuminatum, c. 0.4 cm. longum, 0.15 ad fere 0.2 cm. latum. Sepala lateralia ad basin calcaris vel potius ad pedem gynostemii decurrentia, oblique triangula, acuta vel subacuta, concava, costa media dorso vix incrassata, c. 0.33 – 0.35 cm. longa, 0.125 – 0.2 cm. lata. Petala lanceolata, superne subfalcata et paulo dilatata, acute apiculata, superne concavula, c. 0.35 – 0.4 cm. longa, bene 0.1 cm. lata. Labellum 3lobum, calcaratum, c. 0.47 cm. longum; lobi laterales parvi, gynostemium subaequantes, ad faucem calcaris porrecti, margine postico pedi gynostemii breviter adnati, oblique trianguli, acuminati, acuti, marginibus anticis ad basin lobi intermedii incrassatione transversa horizontali carnosa rotundato-bilobula pubescenti alba conjuncti, albi, intus leviter cinnamomee punctati et stria purpurea a pede gynostemii separati; lobus intermedius recurvulus, transversus, subplanus, apice 3lobulus, basi leviter rotundatus et medio costulis 2 approximatis longitudinalibus convexis inconspicuis donatus, albus, basi maculis 2 gilvis ornatus, c. 0.1 — 0.13 cm. longus, 0.3 — 0.35 cm. latus, lobulis triangulis, lateralibus extus rotundatis obtusis vel subobtusis, intermedio latiore, saepe longiore, acuto; calcar reversum, ovario parallelum, rectum, subcylindricum, obtusum, album, usque ad apicem ovarii c. 0.3—0.35 cm. longum, intus pilosum, pariete postico infra faucem lamella porrecta horizontali lineari-oblonga obtusa alba donatum. Gynostemium ovarium continuum, breve, latum, pallide flavescens, vix cinnamomee suffusum, c. 0.2 cm. longum, auriculis triangulis, acutis. Anthera cucullata, breviter et obtuse rostrata, alba, c. 0.12 cm. lata. Pollinia 4, inaequalia, in corpuscula 2 unita, flava, stipite spathulato, glandula minuta. Rostellum parvum. Stigma magnum, alte excavatum, transversum, semilunatum. Ovarium trigonum, 6sulcatum, cum pedicello c. 0.65 cm. longum.

Java: Buitenzorg, auf dem Salak bei Bobodjong. (J. J. S., kult. in Hort. Bog.). Goenoeng Batoe. (Sundanesischer Sammler, bl. im Dezember 1900). Priangan, Goenoeng Beser bei Tjibeber, in 1000 m ü. d. M., im Urwalde. (W. F. Winckel, bl. im Juli 1917, kult. unter n. 346).

Nach von Tjidadap stammendem, im Garten des Herrn W. F. Winckel kultiviertem Material ist diese früher von mir als eine Varietät der *T. lanceolaria* Bl. betrachtete Pflanze von der Blumeschen Art, ausser durch die Blütenmerkmale, verschieden durch längere, dünnere, lockerer beblätterte Stengel, dünnere Wurzeln und meistens längere und schmälere, grüne, mehr glänzende Blätter.

***Sarcanthus flaccidus** J. J. S. n. sp.

Caulis elongatus, flaccidus, pendulus, praesertim inferne paulum ramosus et basi tantum radicans, teres, c. 80 cm. longus, 0.175 cm. diam., internodiis c. 4—5 cm. longis. Folia (caulis torsione) alterna, pendula, cum caule angulum acutum facientia, elongata, teretia, esulcata, brevi-acutata, carnosa, opaca, dilutius sordide viridia, praesertim adulta sordide atropurpuree maculata, c. 9—17 cm. longa, 0.2—0.27 cm. diam.; vaginae tubulosae, internodia superantes, colore foliorum sed pallidiora, c. 0.225—0.28 cm. diam. Inflorescentiae 2 vaginas perforantes, patentes, elongatae, laxe ramosae, ramulis c. 2—3, minores simplices, ad c. 17.5—19.5 cm. longae, pedunculo leviter compresso, dilute sordide viridi, sordide purpureo-suffuso, c. 2.5—3.5 cm longo, basi vaginulis c. 2 brevibus tubulosis tecto, ramulis patentibus, breviter pedunculatis, laxe multifloris, c. 5.5—7 cm. longis, rachide angulata, dilute viridi. Bracteae persistentes, quaquaversae, parvae, adpressae, triangulae, acutae, concavae, pallide virides, c. 0.1—0.125 cm. longae. Flores parvi, patentissimi, bene aperti, c. 0.66 cm. lati, 0.67 cm. longi, sepalis petalisque membranaceis, pallide flavescentibus, sepalis apice purpurascenti-suffusis. Sepalum dorsale oblongum, obtusum, retusum et apice leviter denticulatum, concavum, fere 0.3 cm. longum, 0.16 cm. latum. Sepala lateralia patentissima et leviter recurva, oblique oblonga, subfalcatula, margine inferiore curvata, apicem versus angustata, obtusa, concavula, c. 0.3 cm. longa, 0.17 cm. lata. Petala oblique oblonga, subrhombea, basi angustata, apice obtusa, et plus minusve retusa, concava, c. 0.25 cm. longa, 0.1 cm. lata. Labellum basi pedi gynostemii distincto adnatum, horizontale, 3lobum, calcaratum, costa longitudinali convexa inter lobos laterales, fere 0.5 cm. longum; lobi laterales oblique erecti, subparalleli, prope pedem gynostemii plica valida introrsa dilute flava instructi, oblique oblongi, margine antico recti, margine postico rotundati, obtusi, concavi, extus convexi, carnosi, glabri, purpurei, basi pallidiores et margine antico papillosi, antice c. 0.14 cm. longi; lobus intermedius porrectus, carnosus, triangulus, apicem versus angustatus, obtusus, facie superiore inferiorem paulo superante, supra praesertim supra basin convexo-incrassatus cum sulco longitudinali, subtus convexus, dense papillosus, dilute purpureus, c. 0.17 cm. longus et latus; calcar reversus, cum parte inferiore labelli et pede gynostemii angulum obtusum faciens, subglobosum, leviter a dorso compressum, purpurascens, c. 0.17 cm. longum, 0.15 cm. latum, intus facie inferiore costa longitudinali valida instructum sed non septatum, callo magno convexo bilobo puberulo albo utrinque in cornu longiusculum horizontale decurvum subulatum glabrum nitidum flavescens exeunte in fauce calcaris in pariete postico. Gynostemium erectum, cum ovario angulum obtusum faciens, leviter a dorso compressum, obtusissimum, basi paulum contractum, dorso convexum, antice subplanum, margine inferne subalato-dilatatum papillosumque, pallide viride, sordide purpureo-suffusum, absque anthera c. 0.15 cm. longum, clinandrio reniformi, concavo, auriculis conicis, porrectis. Anthera cucullata, transversa, truncata, pallide ochrascens cum

connectivo purpureo, c. 0.12 cm. lata. Pollinia 4, inaequimagna, postica minora, in corpuscula 2 ovalia unita, flava, stipite brevi, oblongo-triangulo, albo, glandula magna, transverse ovali-quadrangula, alba, tota c. 0.06 cm. longa. Rostellum breve et crassum, hippocrepidiformi-excisum. Stigma subquadrangulum. Pes gynostemii distinctus, cum ovario angulum rectum faciens, recurvus, quam gynostemium latior, papillosus,albus, c. 0.1 cm. longus. Ovarium etortum, 6sulcatum, dilute viride, c. 0.65 cm. longum.

Java: Priangan, auf dem Goenoeng Beser bei Tjiandjoer in 950 m ü. d. M. (H. A. Gusdorf, leb. Pfl. kult. in Hort. Bog.).

Soela-Inseln: Soela Besi, Kampoeng Molboepa. (P. v. Hulstijn, leb. Pfl. kult. in Hort. Bog. unter n. 5).

Die Art zeigt sehr grosse Ähnlichkeit mit *S. filiformis* Lndl., von dem sie verschieden ist durch längere Internodien, anders gefärbte Blüten, breitere, stumpfe Petalen, eine schmälere Säule, nicht zugespitzte Anthere und ein viel kürzeres Stielchen der Pollinien.

Das Exemplar von Soela Besi ist nicht von dem javanischen verschieden, nur sind die Blätter bis 27 cm. lang.

Sarcanthus flaccidus J. J. S.

Stengel verlängert, schlaff herabhängend, besonders am Grunde etwas verzweigt und nur am Grunde wurzelnd, stielrund, c. 80 cm lang, 0.175 cm dick, die Internodien c. 4—5 cm lang. Blätter (durch Drehung des Stengels) spiralig angeordnet, hängend, mit dem Stengel spitze Winkel darstellend, verlängert, drehrund, ohne Längsfurche, kurz spitzlich, fleischig, matt, ziemlich hellgraugrün, besonders die alten schmutzig dunkelgraupurpurn gefleckt, c. 9—17 cm lang, 0.2—0.27 cm dick; Scheiden röhrig, die Internodien überragend, gefärbt wie die Blätter aber blasser, c. 0.225—0.28 cm im Durchmesser. Blütenstände 2 Scheiden durchbohrend, abstehend, verlängert, locker verzweigt mit c. 2—3 Seitenästen, die schwächeren unverzweigt, bis c. 17.5—19.5 cm lang; Pedunculus etwas zusammengedrückt, schmutzig hellgrün, schmutzig purpurn angelaufen, c. 2.5—3.5 cm lang, am Grunde mit c. 2 kurzen, röhrigen Schaftblättern; Seitenäste abstehend, kurz gestielt, locker vielblütig, c. 5.5—7 cm lang; Rachis kantig, hellgrün. Brakteen bleibend, allseitswendig, klein, anliegend, dreieckig, spitz, konkav, blassgrün, c. 0.1—0.125 cm lang. Blüten klein, weit abstehend, weit geöffnet, c. 0.66 cm breit, 0.67 cm lang, die Sepalen an der Spitze blasspurpurn angelaufen. Unpaares Sepalum länglich, stumpf, eingedrückt und an der Spitze schwach gezähnelt, konkav, fast 0.3 cm lang, 0.16 cm breit. Paarige Sepalen weit abstehend und etwas zurückgebogen, schief länglich, schwach sichelig, mit gebogenem Unterrande, gegen die Spitze verschmälert, stumpf, schwach konkav, c. 0 3 cm lang, 0.17 cm breit. Petalen schief länglich, etwas rautenförmig, an der Basis verschmälert, an der Spitze stumpf und mehr oder weniger eingedrückt, konkav, c. 0.25 cm. lang, 0.1 cm breit. Lippe am Grunde dem deutlichen Säulenfuss angewachsen, horizontal, 3lappig, gespornt, zwischen den Seitenlappen mit einer konvexen Längsrippe, nahezu 0.5 cm lang; Seitenlappen schräg aufrecht, ziemlich parallel, gegen den Säulenfuss mit einer starken, einspringenden, hellgelben Falte, schief länglich, mit geradem vorderem und abgerundetem hinterem Rande, stumpf, konkav, aussen konvex, fleischig, kahl, purpurn, an der Basis heller und am Vorderrande papillös, vorn c. 0.14 cm lang; Mittellappen vorgestreckt, fleischig, dreieckig, gegen die Spitze verschmälert, stumpf, die Oberseite die Unterseite etwas überragend, oben besonders über der Basis konvex verdickt und mit einer Längsfurche, unten konvex, dicht papillös, hellpurpurn, c. 0.17 cm lang und breit; Sporn zurückgerichtet, mit dem vorderen Teil der Lippe und dem Säulenfuss stumpfe Winkel bildend, nahezu kugelig, etwas vom Rücken zusammengedrückt, blasspurpurn, c. 0.17 cm lang, 0.15 cm breit, innen mit einer starken Längsrippe aber nicht septat, am Eingang an der Hinterwand mit einem grossen, konvexen, 2lappigen, kurzflaumigen, weissen, beiderseits mit einem ziemlich langen, horizontalen, niedergebogenen, pfriemlichen, kahlen, glänzenden, blassgelben Hörnchen versehenen Kallus. Säule aufrecht, mit dem Ovarium einen stumpfen Winkel darstellend, etwas vom Rücken zusammengedrückt, sehr stumpf, am Grunde etwas zusammengezogen, mit konvexem Rücken, vorn ziemlich flach, am Rande nach unten etwas flügelig verbreitert und papillös, blassgrün, graupurpurn angelaufen, ohne Anthere c. 0.15 cm lang; Clinandrium nierenförmig, konkav;

Öhrchen kegelig, vorgestreckt. Anthere kappig, quer, abgestutzt, blassockergelb mit purpurnem Konnektiv, c. 0.12 cm breit. Pollinien 4, ungleich gross, die hinteren kleiner, zu 2 ovalen Körperchen vereinigt, gelb, auf einem kurzen, länglich dreieckigen, weissen Stielchen mit grosser, quer oval viereckiger, weisser Klebmasse, im ganzen c. 0.06 cm lang. Rostellum kurz und dick, hufeisenförmig ausgeschnitten. Narbe nahezu viereckig. Säulenfuss gut ausgebildet, mit dem Fruchtknoten einen rechten Winkel bildend, zurückgebogen, breiter als die Säule, papillös, weiss, c. 0.1 cm lang. Fruchtknoten nicht gedreht, 6furchig, hellgrün, c. 0.65 cm lang.

Microsaccus brevifolius J. J. S. in Ic. bog. III (1906), t. CCXXV; etc.

Die Lippe hat auf dem gelben Fleck in der Mitte ein kleines Längsrippchen, das nicht bis zur Basis fortläuft und früher nicht erwähnt wurde.

Die Art wurde auch in Tjidadap, südlich von Tjibeber, gefunden.

* **Microsaccus affinis** J. J. S. n. sp.

Caulis basi radicans, dependens vel patens, apice incurvus, plerumque ramosus, tenuis, dense foliatus, c. 10 cm. longus, cum foliis c. 1.65 — 2 cm. latus, internodiis c. 0.25 — 0.3 cm. longis. Folia alternatim bifaria, margine inferiore patentia, margine superiore subpatentissima, basi imbricantia, lateraliter compressa, a latere visa anguste triangula, acuta, basi supra rarissime fere ad medium anguste triangulo-excavata cum marginibus angustis erectis, rugosa, carnosa, nitidula, viridia, margine superiore c. 0.8 — 1 cm. longa, 0.335 — 0.4 cm. alta; vaginae breves, tubulosae, apice obliquae, rugosae, nitidule virides. Inflorescentiae brevissimae, vaginam perforantes, 2florae, pedunculo abbreviato, albo, c. 0.21 cm. longo, vaginulis latis lateraliter compressis carinatis laminam parvam gerentibus c. 0.36 cm. longis donato. Bracteae ovarium includentes et aequantes, tenues, albidae. Flores parvi, nivei, odorati, c. 0.45 cm. lati, per paucos dies viriditatem conservant, sepalis petalisque divergentibus. Sepalum dorsale oblongum, obtusum, intus planum, dorso obtusangule incrassatum, apice

gibbosum, c. 0.36 cm. longum, 0.13 cm. latum. Sepala lateralia oblique oblonga, obtusa, dorso valde carinata, dorso ad apicem lateraliter compresso-gibbosa, c. 0.35 cm longa, 0.13—0.14 cm. lata. Petala porrecta, apice recurva, oblique oblongo-ovalia, obtusa, dorso medio incrassata et infra apicem carinato-gibbosa, c. 0.275 cm. longa, 0.14 cm. lata. Labellum totum c. 0.3—0.32 cm. longum; lamina basi gynostemio adnatum, gynostemium longe superans, recurvula, cum calcari angulum obtusum vel subrectum faciens, leviter concava, inferne in utraque parte sulci longitudinalis convexa, subtus convexa cum sulco longitudinali, quadrangula, angulis rotundata, gibbo crasso obtuso ad apicem, carnosula, c. 0.2 cm. longa, 0.17 cm. lata; calcar reversum, ovario adpressum, a dorso compressum, subtus ventricosum cum sulco longitudinali, apice late bilobulum, c. 0.12 cm. longum. Gynostemium apice excepto labello adnatum, breve, latum, truncatum, vix 0.1 cm. longum, auriculis dentiformibus. Anthera cucullata, ovata, rostro late triangulo obtuso, connectivo inter thecas incrassato, alba, c. 0.07 cm. longa. Pollinia 4, oblique obovoidea, dilute flava, stipite obverse tranguloo-spathulato, albo, glandula majuscula alba, tota c. 0.1 cm. longa. Ovarium 6sulcatum, album, bene 0 2 cm. longum. Capsula sessilis, ovalis, c. 0.5 cm. longa, 0.4 cm. diam.

Java: Priangan, Tjidadap bei Tjibeber in c. 1000 m ü. d. M. viel. (R. C. Bakhuizen van den Brink, bl. und fr. im Juni und Juli 1917, kult. in Hort. W. F. Winckel sub n. 184). Ebenda, auf dem Goenoeng Beser in c. 1000 m ü. d. M., im Urwalde, viel. (J. J. S. n. 710, bl. im Juni 1917). Eine in der Umgebung des Goenoeng Beser sehr gemeine, das ganze Jahr blühende Pflanze.

Die Art ist nahe verwandt mit *M. ramosus* J. J. S. Sie ist ausgezeichnet durch kleinere Dimensionen, viel weniger weit hinauf rinnige Blätter, bedeutend kleinere Blüten, eine verhältnismässig kürzere, anders gestaltete Lippe.

Microsaccus affinis J. J. S.

Stengel am Grunde wurzelnd, herabhängend oder abstehend mit aufwärts gebogener Spitze, meistens verzweigt, dünn, dicht beblättert, c. 10 cm lang, mit den Blättern c. 1.65—2 cm breit;

Internodien c. 0.25 – 0.3 cm lang. Blätter 2zeilig, abstehend, von der Seite zusammengedrückt, von der Seite gesehen schmal dreieckig, spitz, an der Basis, sehr selten bis zur Mitte. rinnig, runzelig, fleischig, schwach glänzend, grün, c. 0.8 — 1 cm. lang, 0.325 – 0.4 cm. hoch; Scheiden kurz, röhrig, an der Spitze schief, runzelig. Blütenstände sehr kurz, die Scheide durchbohrend, 2blütig; Pedunculus c. 0.17 cm. lang, mit einigen breiten, seitlich zusammengedrückten Scheiden. Brakteen den Fruchtknoten einschliessend und gleich lang, dünn, weisslich. Blüten klein, reinweiss, wohlriechend, 0.45 cm breit, sich einige Tage haltend. Sepalen divergierend, länglich, an der Spitze stumpf und höckerig, besonders die paarigen aussen gekielt, c. 0.35 cm lang, 0.13 cm breit. Petalen vorgestreckt, mit zurückgebogener Spitze, länglich oval, stumpf, unterhalb der Spitze höckerig, 0.275 cm lang, 0.14 cm breit. Lippe im ganzen 0.3 – 0.32 cm. lang; Platte am Grunde der Säule angewachsen, die Säule weit überragend, zurückgebogen, schwach konkav, im unteren Teile beiderseits einer Längsfurche konvex, unten mit einer Längsfurche, viereckig, an den Vorderecken abgerundet, mit einem stumpfen Höckerchen an der Spitze, ziemlich fleischig, c. 0.2 cm lang, 0.17 cm breit; Sporn dem Ovarium angedrückt, vom Rücken zusammengedrückt, unten bauchig mit einer Längsfurche, an der Spitze breit und kurz 2lappig, 0.12 cm lang. Säule der Lippe ziemlich weit hinauf angewachsen, kurz, breit, abgestutzt, kaum 0.1 cm lang, mit zahnförmigen Öhrchen. Anthere kappig, eirund, mit einem breit dreieckigen, stumpfen Schnäbelchen, das Konnektiv zwischen den Theken verdickt, weiss, c. 0.07 cm lang. Pollinien 4, schief verkehrt eiförmig, hellgelb, mit verkehrt dreieckig spateligem Stielchen und grosser Klebmasse, im ganzen 0.1 cm lang. Ovarium 6furchig, weiss, gut 0.2 cm lang. Frucht sitzend, oval, 0.5 cm lang, 0.4 cm im Durchmesser.

Microtatorchis Schltr.

Sepalen und Petalen mehr oder weniger weit hinauf zu einer an der Unterseite gespaltenen Röhre verwachsen, die Petalen meistens etwas kürzer. Lippe gespornt, ganz oder schwach gelappt, an der Spitze meistens (stets?) mit einer mehr oder weniger zurückgerichteten Borste oder Zahn, an der Basis meistens mit einer Aushöhlung, der Sporn am Eingang bisweilen (stets?) von einer Quermembran verschlossen. Säule sehr kurz, mit 2 an der Innenseite die Narben enthaltenden Ärmchen. Pollinien 2, auf einem kurzen oder längeren Stielchen mit kleiner Klebmasse.

Kleine epiphytische Pflanzen mit sehr kurzem Stamm, ohne oder mit kleinen Blättern. Blütenstände mehrblütig, mit kleinen oder blattartigen Brakteen und sehr kleinen Blüten.

Diese Gattung wurde von Dr. R. Schlechter aufgestellt (in Schum. et Laut., Nachträge Flora d. Schutzgeb. Südsee, 105) im Jahre 1905. Die in demselben Jahre geschaffene Gattung *Geissanthera* Schltr. wurde 1911 mit ihr vereinigt (in Fedde Rep. IX,112).

Eeine neue Gattungsbeschreibung wurde bis jetzt nicht gegeben, wiewohl die ursprüngliche in mehrerer Hinsicht ungenau ist. Die Sepalen und Petalen sind wohl stets verwachsen, wie aus den Beschreibungen der Arten hervorgeht. Nur ausnahmsweise erwähnt Schlechter eine zurückgerichtete Borste oder Zahn an der Spitze der Lippe, die bei allen, zwar sehr wenigen, von mir untersuchten Arten vorhanden ist. Die Verschliessung des Spornes braucht ebenfalls noch genauerer Beobachtung.

Die Gattung ist am nächsten verwandt mit der Untergattung *Codonosepalum* von *Taeniophyllum* und eigentlich nur verschieden durch die in der Zweizahl vorhandenen Pollinien.

Das Hauptverbreitungsgebiet liegt in Neu Guinea, wo 22 Arten nachgewiesen worden sind, von welchen nur eine im holländischen Teil der Insel. Einige wenigen Arten finden sich in Neu-Kaledonien und den Samoa-Inseln, während der westlichste Vertreter der Gattung bis jetzt *M. compacta* (Ames) Schltr. von den Philippinen war.

Das Auftreten von 2 Arten, die beide zur Sektion *Eu-Micrototarchis* gehören, auf einmal in Java ist also sehr bemerkenswert.

Sie sind wie folgt auseinander zu halten.

Brakteen blattartig. Sepalen und Petalen nicht bis zur Mitte verwachsen. Lippe mit deutlichen Seitenlappen; Sporn eingebogen. Stielchen der Pollinien spatelig, den Pollinien gleich lang. . . . . *M. javanica* J. J. S.

Brakteen klein. Sepalen und Petalen bis zur Mitte verwachsen.

Lippe ohne deutliche Seitenlappen. Sporn nach hinten gekehrt. Stielchen viel kürzer als die Pollinien... *M. papillosa* J.J.S.

***Microtatorchis javanica** J. J. S. n. sp.

Planta minima. Caulis abbreviatus, radicans, c. 2—4folius, radicibus ad c. 3 cm. longis. Folia lanceolata, subulato-apiculata, basi angustata et conduplicata, supra plana, costa media subtus praesertim apicem versus prominente, viridia, c. 0.425—1.2 cm. longa, 0.15—0 275 cm. lata; vaginae breves. Inflorescentiae erectae, diu florentes, laxe pluriflorae, pedunculo angulato, dilute viridi, evaginulato, c. 0.275—0.6 cm. longo, rachide tenui, flexuosa, glabra, bractearum marginibus carinaque decurrentibus irregulariter marginatis angulata, dilute viridi, omnino parce furfuraceo-puncticulata, ad c. 1.8 cm. longa, internodiis c. 0.15—0.175 cm. longis. Bracteae alternatim bifariae, subpatentissimae, persistentes, foliaceae, rachidem amplectentes, interdum basi dente subulato lamina opposito instructae, suborbiculares ad orbiculari-rhombeae, vel etiam paulo breviores, obtusissimae, apiculatae, basi supra concavae, dorso carinatae, marginibus carinaque grossius erosae, carnosulae, virides, ad c. 0.15 cm. longae, 0.16 cm. latae, superiores minores Flores parvi, succedanei, paulo aperti, pallide virescenti-flavi, c. 0.22 cm. longi, sepalis petalisque canaliculatis, basi in tubum subtus fissum quinquepartitum explanatum c. 0.17 cm. longum 0.26 cm. latum connatis. Sepalum dorsale oblongum, apicem versus leviter angustatum, obtusum, parte libera c. 0.1 cm. longa, 0.04 cm. lata. Sepala lateralia oblique oblongo-triangula, apicem versus angustata, obtusa, dorso carinata, parte libera c. 0.12 cm. longa, 0.05 cm. lata. Petala (pars libera) basi lata, triangula, obtusa, fere 0.1 cm. longa, bene 0.05 cm. lata. Labellum 3lobum, calcaratum, totum bene 0.2 cm. longum, lamina porrecta, supra visa triangula, marginibus incurvis supra contiguis, c. 0.15 cm. longa, lobis lateralibus supra basin, parvis, incurvis, triangulis, acutis, lobo intermedio multo longiore, triangulo, apice in subulam abrupte recurvam producto; calcar breve, reversum, decurvum, oblique globoso-ovoideum, rotundatum, dorso basi convexum, superne subapplanatum et longitudinaliter impressum, c. 0.06 cm. longum. Gynostemium brevissimum, dilute viride. Anthera cucullata, reniformis, brevissime et obtuse apiculata, alba, c. 0.03 cm. lata. Pollinia 2, oblique ovalia, dilute flava, stipite mediocri,

spathulato, basi tenuissimo, glandula parva, tota c. 0.04 cm. longa. Ovarium pedicellatum c. 0.1 cm. longum. Capsula pedicellata, oblique oblongo-ovalis, lateraliter compressa, dorso valde curvata, facie interiore subrecta, inaequaliter 6costata, c. 0.45 — 0.5 cm. longa, 0.3 cm. et 0.22 cm. diam.

Java: Priangan, Tjidadap bei Tjibeber, in c. 1000 m ü.d.M., auf Theesträuchern wachsend. (R. C. Bakhuizen van den Brink, bl. und fr. im Oktober 1916; W. F. Winckel, bl. und fr. im Januar 1918).

Microtatorchis javanica J. J. S.

Sehr kleine Pflanze. Stengel sehr kurz, wurzelnd, c. 2 — 4blättrig. Blätter lanzettlich, mit einem pfriemlichen Spitzchen, am Grunde verschmälert und zusammengelegt, oben flach, mit unten besonders gegen die Spitze vorragender Mittelrippe, grün, c. 0.425 — 1.2 cm lang, 0.15 — 0.275 cm breit; Scheide kurz. Blütenstände aufrecht, lange fortblühend, locker mehrblütig; Pedunculus kantig, hellgrün, ohne Schaftblätter, c. 0.275 — 0.6 cm lang; Rachis dünn, zickzackig, kahl, durch die herablaufenden, ausgefressenen Ränder und Kiele der Brakteen kantig, hellgrün, etwas kleiig punktiert, bis c. 1.8 cm lang, die Internodien 0.15 — 0.175 cm lang. Brakteen 2zeilig, ziemlich weit abstehend, bleibend, blattartig, die Rachis umfassend, bisweilen an der Basis mit einem der Spreite gegenüber gestellten pfriemlichen Zahn, rundlich bis rundlich rautenförmig oder auch kürzer, sehr stumpf, mit einem Spitzchen, oben an der Basis konkav, unten gekielt, der Kiel und die Ränder ziemlich grob ausgefressen, etwas fleischig, grün, bis c. 0.15 cm lang, die höheren kleiner. Blüten nach einander blühend, klein, wenig geöffnet, blassgrünlich gelb, c. 0.22 cm lang, die Sepalen und Petalen rinnig, an der Basis verwachsen, ausgespreizt c. 0.17 cm lang, 0.26 cm breit. Unpaares Sepalum länglich, gegen die Spitze etwas verschmälert, stumpf, der freie Teil 0.1 cm lang, 0.04 cm breit. Paarige Sepalen schief länglich dreieckig, gegen die Spitze verschmälert, stumpf, aussen gekielt, der freie Teil 0.12 cm lang, 0.05 cm breit. Der freie Teil der Petalen mit breiter Basis, dreieckig, stumpf, fast 0.1 cm lang, etwas mehr als 0.05 cm breit. Lippe dreilappig, gespornt, im ganzen 0.2 cm lang; Platte vorgestreckt, von oben gesehen dreieckig, mit eingebogenen, sich oben berührenden Rändern, c. 0.15 cm lang; Seitenlappen über der Basis, klein, eingebogen, dreieckig, spitz; Mittellappen viel länger, dreieckig, die Spitze in eine scharf zurückgerichtete Pfriemspitze vorgezogen; Sporn kurz, zurückgerichtet, herabgekrümmt, schief kugelig eirund, abgerundet, an der Basis am Rücken konvex, nach oben etwas abgeflacht und der Länge nach eingedrückt, c. 0.06 cm lang. Säule sehr kurz, hellgrün. Anthere kappig, nierenförmig, mit einem sehr kurzen und stumpfen Spitzchen, weiss, 0.03 cm breit. Pollinien 2, schief oval, hellgelb, auf einem mässigen, spateligen, am Grunde sehr dünnen Stielchen mit kleiner Klebmasse, 0.04 cm lang. Ovarium mit dem Stielchen 0.1 cm lang. Frucht gestielt, schief länglich oval, seitlich zusammengedrückt, die Rückenseite stark gekrümmt, die Bauchseite nahezu gerade, ungleich 6rippig, c. 0.45—0.5 cm lang, 0.3 cm und 0.22 cm im Durchmesser.

Microtatorchis papillosa J. J. S. n. sp.

Pusilla. Caulis abbreviatus, radicibus elongatis, angustis, subtus planis, supra convexis, ad c. 14 cm. longis, 0.17—0.2 cm. latis. Inflorescentiae laxe pluriflorae, pedunculo filiformi, dense et minutissime papilloso, c. 1—1.5 cm. longo, vaginula adpressa bracteiformi donato, rachide flexuosa, filiformi, more pedunculi papillosa, c. 1.25—1.5 cm. longa, internodiis c. 0.225 - 0.075 cm. longis. Bracteae alternatim bifariae, patentes, ovario adpressae, triangulae, obtusae, acute conico-apiculatae, concavae, c. 0.06 cm. longae. Flores c. 8—12, succedanei, patentes, incurvi, c. 0.5 cm. longi, 0.375 cm. lati, sepalis petalisque usque ad medium in tubum subtus fissum explanatum totum c. 0.325 cm. latum connatis, apice recurvulis, dorso longitudinaliter incrassatis, 1nerviis. Sepalum dorsale totum c. 0.35 cm. longum, parte libera oblongo-ovata, subacuta, c. 0.18 cm. longa, 0.075 cm. lata. Sepala lateralia tota c. 0.4 cm. longa, parte libera oblique oblongo-ovata, subacuta, c. 0.2 cm. longa, 0.08 cm. lata. Petala tota c. 0.34 cm. longa, parte libera oblique ovata, subacuta, c. 0.175 cm. longa, 0.08 cm. lata. Labellum simplex, calcaratum, totum c. 0.45 cm. longum; lamina medio leviter obtusangule recurvula, praesertim inferne canaliculata, lanceolata, superne leviter dilatata, apice subacuminato-angustata, anguste obtusa, apice in aristam suberectam cum lamina angulum acutum facientem c. 0.13 cm. longam exeuns,

excavatione triangula membrana horizontali utrinque adnata postice alte acute triangulo-excisa partim obtecta ad basin; calcar reversum, ovario adpressum, cum lamina angulum faciens, ovale, rotundatum, fauce membrana transversa obliqua adnata postice perforata clausum, c. 0.125 cm. longum. Gynostemium brevissimum, usque ad apicem brachiorum c. 0.08 cm. longum, clinandrio concavo, brachiis apicem longe superantibus, porrectis, semiconduplicato-triangulis, angulato canaliculatis, anguste obtusis. Anthera cucullata, didyma, apice rotundato biloba, postice lobulis 2 triangulis obtusis donata, c. 0.03 cm. lata. Pollinia 2, oblique oblongo-ovalia, stipite brevissimo, glandula parva, tota c. 0.025 cm. longa. Ovarium pedicellatum 6sulcatem, basi paulo incrassatum, rachide crassius, c. 0.18 cm. longum.

Java: Priangan, Ardjasari oberhalb Bandoeng, in c. 1500 m ü. d. M., im Urwalde. (W. Docters van Leeuwen n. 2461, bl. im November 1916).

Beschreibung nach in Alkohol aufbewahrtem Material. Nach Angabe des Sammlers sind die Blüten hellgrün.

Microtatorchis papillosa J. J. S.

Kleine Pflanze. Stengel sehr kurz, mit langen, schmalen, unten abgeflachten, oben konvexen, bis 14 cm langen, 0.17 – 0.2 cm breiten Wurzeln. Blütenstände locker mehrblütig; Pedunculus fädlich, dicht kleinpapillös, c. 1 – 1,5 cm lang, mit einem angedrückten Schaftblatt: Rachis zickzackig, fädlich, papillös, c. 1.25 – 1.5 cm lang, die Internodien 0.225 – 0.075 cm lang. Brakteen 2zeilig, abstehend, anliegend, dreieckig, stumpf, mit einem spitz kegeligen Spitzchen, konkav, c. 0.06 cm lang Blüten allmählich, abstehend, eingebogen, c. 0.5 cm lang, 0.375 cm breit, die Sepalen und Petalen bis zur Mitte verwachsen, mit schwach ausgebogener Spitze, aussen mit einer Längsverdickung, 1nervig. Unpaares Sepalum im ganzen c. 0.35 cm lang, der freie Teil länglich eirund, spitzlich, c. 0.18 cm lang, 0.075 cm breit, die paarigen ähnlich aber schief und etwas länger. Petalen 0.34 cm lang, der freie Teil schief eirund, spitzlich, c. 0.175 cm lang, 0.08 cm breit. Lippe ungeteilt, im ganzen c. 0.45 cm lang; Platte schwach zurückgebogen, besonders nach unten konkav, nach

vorne schwach verbreitert, etwas zugespitzt verschmälert, schmal stumpf, an der Spitze mit einer nahezu geraden, c. 0.13 cm langen Borste, am Grunde mit einer dreieckigen, von einer tief dreieckig ausgeschnittenen Membran überdeckten Aushöhlung; Sporn zurückgerichtet, dem Ovarium angedrückt, mit der Platte einen stumpfen Winkel darstellend, oval, abgerundet, am Eingang von einer nach hinten durchstochenen Quermembran verschlossen, c. 0.125 cm lang. Säule sehr kurz, im ganzen 0.08 cm lang, die Ärmchen die Säulenspitze weit überragend, halbzusammengelegt dreieckig, eckig rinnig, schmal stumpf. Anthere zweiknöpfig, an der Spitze abgerundet 2lappig, nach hinten mit 2 dreieckigen, stumpfen Läppchen, 0.03 cm breit. Pollinien 2, schief länglich oval, auf einem sehr kurzen Stielchen und kleiner Klebmasse. Ovarium mit dem Stielchen 6furchig, an der Basis etwas verdickt, dicker als die Rachis.

Taeniophyllum Bl.

Als ich in 1905 „die Orchideen von Java" publizierte, war die Gattung *Taeniophyllum* durch 6 Arten vertreten. Seitdem hat die Zahl sich zu 15 gesteigert, so dass es wünschenswert erscheint einen neuen Bestimmungsschlüssel zu geben.

T. acuminatissimum Bl. ist noch nicht aufgeklärt worden.

Schlüssel der javanischen *Taeniophyllum*-Arten.

1. Sepalen und Petalen am Grunde verwachsen. Lippe mit einem zurückgerichteten, pfriemlichen Forsatz nahe der Spitze. . . . . 2.
Sepalen und Petalen frei. Lippe ohne pfriemlichen Fortsatz. 9.
2. Blütenstand zwischen den Brakteen mit regelmässig gestellten, pfriemlichen Fortsätzen. Blüten weisslich. *T. tenerrimum* J. J. S.
Blütenstand ohne solche Fortsätze. . . . . 3.
3. Wurzeln an der Spitze Adventivknospen treibend, die zu jungen Pflänzchen auswachsen. Brakteen schmäler als die Rachis. Blüten blassgelblich. Sepalen und Petalen vorbei der Mitte verwachsen. . . . . . *T. proliferum* J. J. S.
Wurzeln keine Adventivknospen bildend. Brakteen nicht schmäler als die Rachis. . . . . 4.
4. Sepalen und Petalen vorbei der Mitte verwachsen, die Röhre

innen mit einem verdickten Ring. Lippe am Grunde beiderseits mit einem stumpfwinkeligen Läppchen. Blüten grünlich. . . . . *T. djampangense* J. J. S.

Sepalen und Petalen nicht bis zur Mitte verwachsen. . 5.

5. Säulenärmchen sehr kurz, die Säulenspitze nicht überragend. Sepalen und Petalen ziemlich weit verwachsen. Blüten blassgelb. Pedunculus deutlich. . . . *T. Bakhuizenii* J. J. S.

Säulenärmchen die Säulenspitze überragend. . . . . . 6.

6. Säulenärmchen wenig länger als die Säulenspitze. Sepalen und Petalen nur am Grunde verwachsen. Pfriemlicher Fortsatz der Lippe sehr kurz. . . . . 7.

Säulenärmchen viel länger als die Säulenspitze. Sepalen und Petalen wenigstens bis $^1/_3$ von der Basis verwachsen. Fortsatz der Lippe lang pfriemlich. . . . . 8.

7. Blüten verhältnismässig gross, hellorange bis lachsfarben. Sepalen und Petalen pfriemlich, 0.575—0.75 cm. lang. *T. radiatum* J. J. S.

Blüten blassgelblich. Sepalen 0.35 cm. lang, lanzettlich. *T. biloculare* J. J. S.

8. Blütenstände deutlich gestielt, locker. Blüten blassgrün. Sporn innen mit einer Drüse. . . . *T. glandulosum* Bl.

Blütenstände dicht; Pedunculus sehr kurz. Blüten und häufig die ganze Pflanze mehr oder weniger, bisweilen stark orange oder braun gefärbt. . . . . . . *T. aurantiacum* J. J. S.

9. Anthere in ein langes Schnäbelchen verschmälert. . . 10.

Anthere kurz, bisweilen mit einem kurzen Schnäbelchen. Blüten mit violetter oder purpurner Zeichnung. . . 12.

10. Lippe kurz, stark konkav, am Grunde sehr kurz sackig, innen mit einer Quermembran. Säule mit purpurn gezeichnet. Blütenstände kurz. . . . *T. rostellatum* J. J. S.

Lippe innen ohne solche Membran, mit gut ausgebildetem Sporn. Blüten einfach gelb. . . . . 11.

11. Blütenstände locker, lang grob behaart (weichstachelig). Rostellum sehr kurz. . . . . *T. hirtum Bl.*

Blütenstände kahl, dichtblütig, mit fadenförmigem Stiel. Rostellum gross. . . . . *T. filiforme* J. J. S.

12. Lippe mit eingebogener, stumpfer Spitze. Anthere gelblich mit purpurnem Schnäbelchen. . . *T. Hasseltii* Rchb. f.

Lippe an der Spitze nicht einwärtsgebogen. Anthere purpurn oder violett mit weisslichem Schnäbelchen. . . . . . 13.

13. Blüten gelb. Lippe mit kurzem, stumpfem Sporn, weiss, im ganzen 0.4—0.45 cm lang. Säule weiss. . *T. obtusum* Bl.

Blüten gelblich weiss. Lippe mit langem, etwas keuligem Sporn, weiss mit violetten Flecken, im ganzen 0.775 cm lang. Säule weiss und violett. . . *T. biocellatum* J. J. S.

***Taeniophyllum proliferum** J. J. S. n. sp.

Planta pusilla, caule obsoleto, squamis paucis, radicibus 1 vel paucis, substrato arcte adpressis, subteretibus, subtus tantum applanatis, c. 0.8—2 cm. longis, 0.05—0.075 cm. latis, pallide viridibus, apice gemmam adventivam emittentibus. Inflorescentiae 1 vel paucae, multiflorae, diu florentes, pedunculo brevi, angulato, pallide viridi, c. 0.2—0.3 cm. longo, rachide vix flexuosa, bene lateraliter compressa, ad fere 0.1 cm. diam., pallide viridi, ad c. 3 cm. longa, cum bracteis c. 0.12 cm. lata, internodiis c. 0.05 cm. longis. Bracteae parvae alternatim bifariae, patentissimae, latitudine rachidis angustiores, triangulae, acutae, concavae, pallide virides, c. 0.04 cm. longae. Flores minuti, succedanei, pallide flavo-virides, c. 0.2 cm. longi. Sepala petalaque ultra medium in tubum antice fissum explanatum c. 0.16 cm. longum bene 0.2 cm. latum connata, partibus liberis leviter divergentibus, carnosulis, non concavis. Sepala (partes liberae) oblongo-triangula, subobtusa, c. 0.07 cm. longa, basi 0.04 cm. lata, lateralia leviter obliqua, margine antico inferne labello adhaerentia. Petala (partes liberae) sepalis breviora, triangula, subacuta, fere 0.06 cm. longa, basi 0.05 cm. lata. Labellum calcaratum, totum c. 0.2 cm. longum; calcar reversum, ovario adpressum, oblique subglobosum, intus glandula minuta subglobosa donatum, ostio membrana verticali transversa postice bilobula clausum, bene 0.05 cm. longum, utroque latere constrictione transversa a lamina sejunctum; lamina porrecta, recta, concava, triangula, basi utrinque lobulo parvo erecto rotundato dilatata, excavatione lata semiorbiculari antice rotundata et acute marginata ad basin laminae inter lobulos, apice supra visa acuta, supra paulum infra apicem appendice filiformi-subulata oblique erecta reversa recta c. 0.06 cm. longa instructa, semipellucida, pallide viridis, c. 0.14 cm. longa, explanata 0.07 cm. lata. Gynostemium breve, dorso

convexum, totum c. 0.05 cm. longum, clinandrio excavato, brachiis antheram bene superantibus, in excavationem labelli quadrantibus, porrectis, parallelis, oblongis, obtusis, extus convexis, intus stigmaticis. Anthera cucullata, didyma, obreniformis, basi 2lobula, alba, c. 0.03 cm. lata. Pollinia 4, geminata, oblique pyriformia, paulo inaequalia, flava, stipite brevi, albo. Ovarium pedicellatum pallide viride, c. 0.08 cm. longum. Capsula brevissime pedicellata, curvata, 12costata.

Java: Priangan, Tjidadap bei Tjibeber in c. 1000 m ü.d.M., an dem Stamm und den Zweigen alter Theesträuchern. (R. C. Bakhuizen van den Brink, nahezu das ganze Jahr blühend, ausser in der trocknen Zeit).

Diese ausserordentlich bemerkenswerte Pflanze wurde von Herrn R. C. Bakhuizen van den Brink auf alten Theesträuchern entdeckt.

Der Keimling hat die gewöhnliche Gestalt; er besteht aus einem länglichen, von der Seite zusammengedrückten, auf dem Querschnitt dreieckigen, lebhaft hellgrünen Körper und erreicht eine Länge von 0.6 — 1.1 cm und eine Höhe von 0.075 — 0.25 cm. Dieser bildet in der gewöhnlichen Weise eine beschuppte Knospe, woraus die Blütenstände und eine bis wenige Wurzeln hervorbrechen. Die Wurzeln sind dem Substrat fest angedrückt, ungefähr drehrund, nur an der Unterseite abgeflächt und besitzen im Gegensatz zu den Keimlingen durch die Anwesenheit einer Velamenschicht eine weisslichgrüne Farbe. So bald die Wurzeln eine gewisse Länge erreicht haben, bilden sie an ihrer Spitze eine Adventivknospe, die zu einem dem Keimling völlig ähnlichen Gebilde heranwächst und sich auch weiter in der nämlichen Weise benehmt. So entstehen ganze Systeme zusammenhängender Pflänzchen.

Taeniophyllum proliferum J. J. S.

Sehr kleine Pflanze. Stengel sehr kurz, mit wenigen Schuppen und einer bis wenigen dem Substrat fest angedrückten, nahezu drehrunden, nur an der Unterseite abgeflächten, weisslichgrünen, c. 0.8 — 2 cm langen, 0.05 — 0.075 cm breiten, an der Spitze stets eine zu einer neuen Pflanze auswachsende Adventivknospe bildenden Wurzeln. Blütenstände 1 bis wenige, lange fortblühend; Pedunculus kurz, kantig, blassgrün, c. 0.2—0.3 cm lang; Rachis kaum zickzackig, von der Seite zusammengedrückt, bis c. 3 cm lang, mit den Brakteen c. 0.12 cm breit, die Internodien c. 0.05 cm lang. Brakteen klein, weit abstehend, schmäler als die Breite der Rachis, dreieckig, spitz, konkav, blassgrün, c. 0.04 cm lang. Blüten sehr klein, 2zeilig, nach einander blühend, blassgelbgrün, c. 0.2 cm lang. Sepalen und Petalen bis über die Mitte verwachsen, ausgezpreizt c. 0.16 cm lang, etwas über 0.2 cm breit, die freien Teile etwas divergierend, etwas fleischig, nicht konkav. Freie Teile der Sepalen länglich dreieckig, stumpflich, c. 0.07 cm lang, 0.04 cm breit, die paarigen etwas schief und mit dem Vorderrande gegen die Basis der Lippe etwas anhängend. Freie Teile der Petalen kürzer als die Sepalen, dreieckig, spitzlich, nahezu 0.06 cm lang, 0.05 cm breit. Lippe gespornt, im ganzen c. 0.2 cm. lang; Sporn dem Fruchtknoten angedrückt, schief kugelig, innen mit einer kleinen, ungefähr runden Drüse, am Eingang durch eine hinten 2lappige Quermembran verschlossen, beiderseits durch eine Einschnürung von der Spreite getrennt, etwas mehr als 0.05 cm lang; Spreite vorgestreckt, gerade, konkav, dreieckig, an der Basis beiderseits in ein kleines, aufrechtes, abgerundetes Läppchen verbreitert, an der Basis mit einer breiten, halbrunden, vorn abgerundeten und scharf berandeten Aushöhlung, von oben gesehen spitz, oben etwas unterhalb der Spitze mit einem dünn pfriemlichen, schräg aufrechten, rückwärts gekehrten, geraden, c. 0.06 cm langen Anhängsel, durchscheinend, blassgrün, c. 0.14 cm lang, ausgespreizt 0.07 cm breit. Säule kurz, 0.05 cm lang, die Ärmchen die Anthere gut überragend, vorgestreckt, in die Aushöhlung der Lippe hineinpassend, parallel, länglich, stumpf, aussen konvex. Anthere kappig, gedoppelt, verkehrt nierenförmig, an der Basis 2lappig, weiss. Pollinien 4, schief birnförmig, etwas ungleich, gelb, auf einem kurzen, weissen Stielchen. Ovarium mit dem Stielchen blassgrün, c. 0.08 cm lang. Frucht sehr kurz gestielt, gekrümmt, 12rippig.

*__Taeniophyllum djampangense__ J. J. S. in Bull. Jard. Bot. Buit. 2e sér. No. IX (1913), 112.

Planta pusilla. Caulis abbreviatus, squamatus, radicibus paucis,

cortici adpressis, omnibus plus minusve lateraliter compressis, sectione transversa triangulis, ad c. 4.5 cm. longis. Inflorescentiae plures, breves, multiflorae, diu florentes, pedunculo brevissimo, dilute viridi, c. 0.2 – 0.35 cm. longo, rachide leviter flexuosa, quadrangula, vix lateraliter compressa, antice et postice sulco flexuoso instructa, dilute viridi, 1.5 cm. superante, cum bracteis c. 0.15 – 0.16 cm. lata, internodiis c. 0.05 – 0.07 cm. longis. Bracteae alternatim bifariae, patentes, rachidem semiamplectentes, triangulae, concavae, acutae, dorso carinato-apiculatae, dilute virides, c. 0.07 – 0.075 cm. longae. Flores parvi, succedanei, succosi, pallide virescentes, c. 0.46 cm. longi, 0.25 cm. lati, sepalis petalisque ultra medium in tubum subtus sectum intus annulo incrassato transverso instructum connatis, apice leviter divergentibus. Sepalum dorsale totum c. 0.35 cm. longum, parte libera ovata, oblongo-triangulo-angustata, acuta, concava, c. 0.15 cm. longa, 0.075 cm. lata. Sepala lateralia tota c. 0.35 cm. longa, parte libera oblique triangula, apice lateraliter compresso-subacuta, canaliculata, c. 0.15 cm. longa. Petala c. 0.33 cm. longa, parte libera triangula, vix acuminata, acuta, c. 0.13 cm. longa, 0.075 cm. lata. Labellum calcaratum, constrictione obliqua utrinque inter calcar et laminam, totum c.. 0.45 cm. longum; lamina 3loba, c. 0.3 cm. longa; lobi laterales breves, ante gynostemium erecti, obtusangule trianguli, membrana transversa tenera obliqua emarginata conjuncti; lobus intermedius rectus, linearis, concavus, acute acuminatus, apice triquetro-subulatus, supra bene infra apicem subula conspicua reversa instructus, c. 0.2 cm. longus; calcar reversum, ovario adpressum, subgloboso-ovale, rotundatum, fauce membrana tenera obliqua circumnexa supra anguste perforata clausum, dorso c. 0.13 cm. longum. Gynostemium dilute viride, dorso convexum et papillosum, totum c. 0.07 cm. longum, brachiis stigmaticis elongatis, oblique lanceolatis, antheram multo superantibus, extus convexis, albidis. Anthera cucullata, ambitu sudsemiorbicularis, apice retusa, basi lobulis 2 angulatis instructa, alba, fere 0.03 cm. lata. Pollinia 4, libera, pyriformia, dilute flava. Ovarium 6sulcatum, dilute viride, c. 0.2 lomgum.

Java: Priangan, Djampang Tengah bei Artana, in c. 800 m ü. d. M., auf einem *Ficus* im sekundären Walde. (J.J.S., bl. im Dezember 1900). Tjidadap bei Tjibeber, in c. 1000 m. ü. d. M., auf Theesträuchern. (R. C. Bakhuizen van den Brink, bl. im November 1916).

Durch das schöne, neulich erhaltene Material bin ich jetzt in der Lage eine bessere Beschreibung dieser gut charakterisierten Art zu geben.

***Taeniophyllum Bakhuizenii** J. J. S. n. sp.

Planta parva, caule abbreviato, squamis adpressis tecto, radicibus adpressis, elongatis, subteretibus, subtus tantum applanatis, pallide viridibus, ad c. 24 cm. longis, 0.075—0.125 cm. latis. Inflorescentiae plures, diu florentes, multiflorae, pedunculo filiformi, pallide virescenti, deinde ochrascenti-suffuso, c. 0.5—0.8 cm. longo, rachide tenui, flexuosa, quadrangula, verruculosa, colore pedunculi, c. 0.7—2.5 cm. longa, cum bracteis 0.16—0.17 cm. lata, internodiis c. 0.075—0.125 cm. longis. Bracteae alternatim bifariae, patentes vel subpatentissimae, semiamplectentes, breves, ovato-triangulae, acutae, concavae, carinatae, dorso c. 0.07 cm. longae. Flores teneri, succosi, pallide flavi, c. 0.375 cm. longi, 0.3 cm. lati, sepalis petalisque fere ad medium in tubulum subtus fissum connatis, apice recurvis. Sepalum dorsale canaliculato-concavum, totum c. 0.34 cm. longum, parte libera triangulo-lanceolata, subacuta, concava, c. 0.2 cm. longa, 0.07 cm. lata. Sepala lateralia obliqua, tota c. 0.33 cm. longa, parte libera lineari-lanceolata, obtusiuscula, concava, c. 0.2 cm. longa, 0.07 cm. lata. Petala tota c. 0.3 cm. longa, parte libera ovato-lanceolata, acuminata, subacuta, concava, c. 0.175 cm. longa, 0.07 cm. lata. Labellum calcaratum, simplex, totum c. 0.37 cm., usque ad apicem ovarii 0.32 cm. longum; lamina porrecta, apice recurva, concava, lanceolato-triangula, acuminata, apice lateraliter compresso-subulata et supra in c. 0.08 cm. infra apicem subulam reversam tenuem c. 0.1 cm. longam gerens, basi utrinque paulo rotundato-dilatata et incurvula, excavatione antice membrana transversa horizontali reversa exciso-bilobula obtecta ad basin, explanata c. 0.32 cm. longa, basi 0.125 cm. lata; calcar reversum, ovario adpressum, breviter ovoideum, obtusum, intus eglandulosum, c. 0.1 cm. longum. Gynostemium brevissimum, 3lobum, dilute viride, absque anthera c. 0.025 cm. longum, clinandrio concavo, apice truncato, lobulis basilaribus stigmaticis vix brevioribus, rotundatis. Anthera cucul-

lata, transverse subovalis, alba, c. 0.04 cm. lata. Pollinia 4, subglobosa, paulo inaequimagna, flava, cum stipite mediocri apice valde dilatato et involuto albo et glandula mediocri c. 0.07 cm. longa. Rostellum porrectum, subulato bipartitum. Ovarium curvulum, 6sulcatum, in sulcis papillosum, dilute viride, c. 0.2 cm. longum. Fructus subcylindricus, valde 9angulato-costatus, angulis irregulariter marginatus, basi obtusus et abrupte brevissime pedicellato-contractus, apice obtusus et flore marcido coronatus, dilute viridis, c. 1—1.6 cm. longus, 0.25—0 27 cm. diam., rima 1 longitudinali dehiscens.

Java: Priangan, Tjitjoeroek und Tjidadap bei Tjibeber in c. 1000 m ü. d. M., an alten, bemoosten Theesträuchern; hier sehr gemein. (R. C. Bakhuizen van den Brink, bl. und fr. im September und Oktober 1916; nach Angabe nahezu das ganze Jahr blühend).

Die Pflanze sieht unter den javanischen Arten *T. glandulosum* Bl. und *T. biloculare* J. J. S. am ähnlichsten, unterscheidet sich von beiden u.m. durch die sehr kurzen Säulenärmchen. Ausserdem ist sie vor *T. glandulosum* Bl. ausgezeichnet durch die viel kürzeren, dichteren Blütenstände, und vor *T. biloculare* J. J. S. durch die lang ausgezogene und von einer langen Borste versehene Lippe.

Taeniophyllum Bakhuizenii J. J. S.

Kleine Pflanze, mit sehr kurzem, angedrückt schuppigem Stengel und verlängerten, angedrückten, fast drehrunden, nur an der Unterseite abgeflächten, blassgrünen, bis c. 24 cm langen, 0.075—0.125 cm breiten Wurzeln. Blütenstände mehrere, lange fortblühend, vielblütig; Pedunculus fadenförmig, blassgrünlich, später gelblich angelaufen, c. 0.5—0.8 cm lang; Rachis dünn, zickzackig, vierkantig, kleinwarzig, gefärbt wie der Pedunculus, c. 0.7—2.5 cm lang, mit den Brakteen 0.16—0.17 cm breit; die Internodien 0.075—0.125 cm lang. Brakteen 2zeilig, abstehend oder ziemlich weit abstehend, die Rachis halbumfassend, kurz, eirund dreieckig, spitz, konkav, gekielt, am Rücken 0.07 cm lang. Blüten zart, saftig, blassgelb, c. 0.375 cm lang, 0.3 cm breit, die Sepalen und Petalen nicht bis zur Mitte verwachsen, mit auswärts gebogener Spitze. Unpaares Sepalum konkav, im ganzen 0.34 cm lang, der freie Teil dreieckig lanzettlich, spitzlich, konkav, 0.2 cm lang, 0.07 cm breit. Paarige Sepalen schief, im ganzen 0.33 cm lang, der freie Teil linear lanzettlich, stumpflich, konkav, 0.2 cm lang, 0.07 cm breit. Petalen im ganzen 0.3 cm lang, der freie Teil eirund lanzettlich, zugespitzt, spitzlich, konkav, 0.175 cm lang, 0.37 cm breit. Lippe gespornt, ungeteilt, im ganzen 0.37 cm, bis zur Spitze des Fruchtknotens 0.32 cm lang; Platte vorgestreckt, an der Spitze zurückgekrümmt, konkav, lanzettlich dreieckig, zugespitzt, an der Spitze seitlich zusammengedrückt pfriemlich und oben in c. 0.08 cm unterhalb der Spitze mit einer zurückgerichteten, c. 0.1 cm langen Borste, an der Basis beiderseits etwas abgerundet verbreitert und eingebogen, mit einer vorn durch eine horizontale, zurückgerichtete, ausgeschnittene, kurz 2lappige Quermembran überdeckten Aushöhlung am Grunde, ausgespreizt c. 0.32 cm lang, an der Basis 0.125 cm breit; Sporn zurückgerichtet, dem Ovarium angedrückt, kurz eiförmig, stumpf, innen ohne Drüse, c. 0.1 cm lang. Säule sehr kurz 3lappig, hellgrün, ohne Anthere 0.025 cm lang, mit konkavem Clinandrium, an der Spitze abgestutzt, die Fussläppchen etwas kürzer als die Säulenspitze, abgerundet, innen stigmatisch. Anthere kappig, ungefähr queroval, weiss, 0.04 cm breit. Pollinien 4, ungefähr kugelig, etwas ungleich gross, gelb, mit dem mässigen, an der Spitze stark verbreiterten und eingerollten, weissen Stielchen und mittelgrossen Klebmasse c. 0.07 cm lang. Rostellum vorgestreckt, pfriemlich 2teilig. Ovarium gebogen, 6furchig, in den Furchen papillös, hellgrün, 0.2 cm lang. Frucht ungefähr zylindrisch, stark 9kantig-rippig, die Ränder unregelmässig, am Grunde stumpf und abgebrochen sehr kurz stielförmig zusammengezogen, an der Spitze stumpf und von der welken Blüte gekrönt, hellgrün, c. 1 – 1.6 cm lang, 0.15 – 0.27 cm im Durchmesser, mittels einer Längsspalte aufspringend.

***Taeniophyllum radiatum** J. J. S. n. sp.

Caulis abbreviatus, squamatus, radicibus cortici adpressis, valde compressis, linearibus, c. 8 – 18 cm. longis, 0.25 – 0.35 cm. latis. Inflorescentiae numerosae, erectae, breves, multiflorae, diu florentes, pedunculo tenui, papilloso, viridi, c. 0.5 – 0.6 cm. longo, inferne nonnullis vaginulis donato, rachide flexuosa, minute pa-

pillosa, viridi, c. 0.65—1 cm. longa, cum bracteis c. 0.175 cm. lata, internodiis c. 0.05 cm. longis. Bracteae alternatim bifariae, patentes, late triangulae, concavae, acute acuminatae, carinatae, dilute virides, c. 0.06 cm. longae. Flores succedanei, majusculi, bene aperti, dilute aurantiaci vel dilute salmonei, c. 0.67—1 cm. lati, 0.67—0.85 cm longi, sepalis petalisque basi in tubum brevem subtus sectum connatis, superne recurvis, subulatis, concavis. Sepalum dorsale totum c. 0.575—0.76 cm. longum, basi longitudine 0.1—0.13 cm. cum petalis connatum, 0.07—0.1 cm. latum. Sepala lateralia falcata, 0.575—0.76 cm. longa, basi longitudine 0.14—0.175 cm. petalis adnata, c. 0.075—0.1 cm. lata. Petala c. 0.55—0.75 cm. longa, 0.075—0.1 cm. lata. Labellum calcaratum, inter calcar et laminam constrictum; lamina subulata, superne recurva, concava, appendice minuta tenuiter subulata reversa supra infra apicem, excavatione transversa antice acuminata ad basin, c. 0.55—0.8 cm. longa, 0.13 cm. lata; calcar reversum, ovario adpressum, ovoideo-globosum, fauce septo transverso perforato clausum, c. 0.07—0.1 cm. longum. Gynostemium breve, dorso convexum, flavum, lobis stigmaticis porrectis, obtusis, antheram superantibus, c. 0.05 cm. longum. Anthera cucullata, alte didyma, apice angustata et truncata, lobulis 2 ad basin, alba, c. 0.05 cm. lata. Pollinia 4, libera, oblique obovoidea, leviter compressa, flava, stipite brevi, apice recurvo, glandula majuscula, lanceolata, antice acuta, postice obtusa, tota c. 0.075 cm. longa. Ovarium 6sulcatum, basi album, superne pallide viride, c. 0.17—0.27 cm. longum.

Java: Priangan, Tjisokan bei Tjibeber, in 750 m ü. d. M., ziemlich häufig an feuchten Wasserkanten auf bemoosten Zweiglein und feuchten Steinen und Tjadas. (R. C. Bakhuizen van den Brink, bl. und fr. im Oktober 1916).

Eine Art mit verhältnismässig langen und schmalen Sepalen und Petalen.

Bemerkenswert ist es, dass sie nicht nur epiphytisch wächst, sondern auch an Steinen und am Boden vorkommt.

Taeniphyllum radiatum J. J. S.

Stengel sehr kurz, mit Schuppen und dem Substrat fest

angedrückten, stark zusammengedrückten, linearen, c. 8 - 18 cm langen, 0.25—0.35 cm breiten Wurzeln. Blütenstände zahlreich, aufrecht, kurz, vielblütig, lange fortblühend; Pedunculus dünn, papillös, grün, c. 0.5 - 0.6 cm lang, mit einigen Schaftblättern; Rachis zickzackig, fein papillös, grün, c. 0.65—1 cm lang, mit den Brakteen c. 0.175 cm breit, die Internodien c. 0.05 cm lang. Brakteen 2zeilig, abstehend, breit dreieckig, konkav, spitz zugespitzt, gekielt, hellgrün, c. 0.06 cm lang. Blüten in Zwischenräumen blühend, ziemlich gross, gut geöffnet, hellorange oder helllachsfarben, c. 0.67—1 cm breit, 0.67—0.85 cm lang, die Sepalen und Petalen am Grunde kurz verwachsen, zurückgekrümmt, pfriemlich, konkav, c. 0.575 cm lang, 0.075—0.1 cm breit, die Petalen kaum kürzer. Lippe zwischen dem Sporn und der Platte eingeschnürt; Platte pfriemlich, der obere Teil zurückgebogen, konkav, oben unterhalb der Spitze mit einem zurückgerichteten, dünn pfriemlichen Anhängsel, am Grunde mit einer vorn zugespitzten Queraushöhlung, c. 0.55—0.8 cm lang, 0.13 cm breit; Sporn dem Ovarium angedrückt, eirund kugelig, am Eingang durch eine perforierte Quermembran verschlossen, c. 0.07—0.1 cm lang. Säule kurz, gelb, c. 0.05 cm lang, mit vorgestreckten, stumpfen, die Anthere überragenden Narbenärmchen Anthere kappig, gedoppelt, an der Spitze verschmälert und abgestutzt, mit 2 Läppchen am Grunde, weiss, c. 0.05 cm breit. Pollinien 4, schief verkehrt eirund, schwach zusammengedrückt, gelb, auf einem kurzen, an der Spitze zurückgebogenen Stielchen, mit grosser, lanzettlicher, vorn spitzer, nach hinten stumpfer Klebmasse, 0 075 cm lang. Ovarium 6furchig, an der Basis, weiss, nach oben blassgrün, 0.17—0.27 cm lang.

* **Taeniophyllum aurantiacum** J. J. S. n sp.

Planta pusilla. Caulis abbreviatus, squamatus, radicibus cortici adpressis, sectione transversa triangulis, cinereo-viridibus, saepe plus minusve cinnamomeo-tinctis ad rufis, usque ad c. 2.5—7 cm. longis, 0.1—0.15 cm. latis. Inflorescentiae plures, breves, multiflorae, diu florentes, pedunculo brevissimo, filiformi, c. 0.1—0.15 cm, longo, rachide tenui, flexuosa, quadrangula, minute papillosa. virescenti-fuscescenti vel plus minusve cinnamomea vel rufa, ad c. 1.1 cm. longa, cum bracteis 0.14—0.2 cm. lata, internodiis c. 0.05 cm. longis. Bracteae alternatim bifariae, subpatentissimae,

triangulae, acutae, concavae, carinatae, colore rachidis, c. 0.06 — 0.075 cm. longae. Flores succedanei, subcarnosuli, dilute aurantiaci ad rufi, c. 0.475 cm. (0.4 — 0.57 cm.) longi, 0.13 cm. lati, sepalis petalisque infra medium in tubum subtus fissum connatis, apice recurvulis. Sepalum dorsale c. 0.36 cm. longum, parte libera triangulo-lanceolata, acuta, fere 0.2 cm. longa, 0.075 cm. lata. Sepala lateralia c. 0.36 cm. longa, parte libera oblique elongato-triangula, obtusa, c. 0.2 cm. longa, 0.08 cm. lata. Petala sepalis spaulo breviora, parte libera oblongo-ovato-triangula, subacuminata subacuta, c. 0.17 — 0.175 cm. longa, 0.075 cm. lata. Labellum totum c. 0.43 cm. longum; lamina porrecta, inferne concava cum costula convexa longitudinali, oblonga, apicem versus angustata, apice recurvula lateraliter compressa supra visa acuta, seta reversa recta cum labello angulum acutum faciente c. 0.075 cm. longa supra c. 0.05 cm. infra apicem, basi utrinque lobulo minimo obtuso erecto donata, excavatione transversa antice in canaliculam longitudinalem producta et membrana horizontali utrinque adnata postice emarginata obtecta; calcar reversum, ovario adpressum, oblique ovali-globosum, obtusum, subtus longitudinaliter sulcatum, intus ecallosum, fauce membrana transversa excisa clausum, fere 0.15 cm. loausum, Gynostemium brevissimm, dorso convexum, pallide aurantiacum vel aurantiacum, totum c. 0.05 — 0.06 cm. longum, apice late truncatum, brachiis stigmaticis apicem bene superantibus, porrectis, apice incurvulis, linearibus, obtusis, extus convexis, intus concavis, albis. Anthera cucullata, ambitu quadrangula, didyma, thecis subglobosis, postice lobulis 2 minoribus donata, albida vel pallide aurantiaca, c. 0.04 cm. lata. Pollinia 4, inaequimagna, postica minora, pyriformia, pallide flava, stipite brevissimo albo, glandula mediocri obovata alba, tota bene 0.03 cm. longa. Ovarium 6sulcatum, c. 0.275 cm. longum. Capsula brevissime pedicellata, saepe curvula, cylindrica, basi apiceque obtusa, 6sulcata, sordide viridis, plus minusve haud raro valde aurantiaco-suffusa, c. 1 — 1.4 cm. longa, 0.2 — 0.23 cm. diam., rima unica dehiscens.

Java: Priangan, Tjidadap bei Tjibeber, in c. 1000 m ü. d. M., häufig an dem Stamm und den Zweigen von Theesträuchern und *Ficus*-Arten. (R. C. Bakhuizen van den Brink, bl. und fr. im Oktober 1916, im April und Mai 1917; nach Angabe das ganze Jahr blühend).

Eine kleine Art der Sektion *Codonosepalum* mit sehr kurzen, fast sitzenden, vielblütigen Inflorescenzen. Die ganze Pflanze ist meistens mehr oder weniger braunorange gefärbt.

Taeniophyllum aurantiacum J. J. S.

Kleine Pflanze. Stengel sehr kurz, mit Schuppen und der Rinde angedrückten, auf dem Querschnitt dreikantigen, graugrünen, oft mehr oder weniger rotbraun gefärbten, bis c. 2.5—7 cm langen, 0.1—0.15 cm breiten Wurzeln. Blütenstände mehrere, kurz, vielblütig, lange fortblühend; Pedunculus sehr kurz, fadenförmig, c. 0.1—0.15 cm lang; Rachis dünn, zickzackig, vierkantig, kleinpapillös, grünbraünlich oder mehr oder weniger rotbraun, bis c. 1.1 cm lang, mit den Brakteen 0.14—0.2 cm breit, die Internodien c. 0.05 cm lang. Brakteen zweizeilig, ziemlich weit abstehend, dreieckig, spitz, konkav, gekielt, c. 0.06—0.075 cm lang. Blüten allmählich, etwas fleischig, hellorange bis rotbraun, c. 0.475 (0.4—0.57 cm) lang, 0.33 cm breit, die Sepalen und Petalen nicht bis zur Mitte verwachsen, an der Spitze schwach auswärts gebogen. Sepalen lanzettlich dreieckig, im ganzen c. 0.36 cm, der freie Teil 0.2 cm lang, 0.08 cm breit. Petalen etwas kürzer, der freie Teil länglich eirund dreieckig, schwach zugespitzt, c. 0 17 cm lang, 0 075 cm breit. Lippe im ganzen c. 0.17 cm lang; Platte vorgestreckt, länglich, gegen die Spitze verschmälert, an der Spitze etwas zurückgebogen, von der Seite zusammengedrückt und von oben gesehen spitz, oben unterhalb der Spitze mit einer spitzwinkelig zurückgerichteten, pfriemlichen, c. 0.075 cm langen Borste, an der Basis beiderseits mit einem kleinen, stumpfen Läppchen, konkav, am Grunde mit einer nach vorne in eine kleine Längsrinne ausgehenden, von einer nach hinten ausgerandeten Haut überdeckten Queraushöhlung; Sporn zurückgerichtet, dem Ovarium angedrückt, schief oval kugelig, stumpf, unten, mit einer Längsfurche, innen ohne Schwiele, am Eingang von einer ausgeschnittenen Quermembran verschlossen, nahezu 0.15 cm lang. Säule sehr kurz, c. 0.05—0.06 cm lang, die die Narben enthaltenden Ärmchen die Spitze weit überragend, vorgestreckt, linear, stumpf, innen konkav, aussen konvex. Anthere im Umriss viereckig, mit nahezu kugeligen Theken und 2 kleineren Läppchen am Grunde, c. 0.04 cm breit. Pollinien 4, ungleich gross, birnförmig, blassgelb, auf einem sehr

kurzen, weissen Stielchen mit verkehrt eirunder, weisser Klebmasse, im ganzen gut 0.03 cm lang. Ovarium 6furchig, c. 0.275 cm lang. Frucht sehr kurz gestielt, häufig etwas gekrümmt, zylindrisch, stumpf, 6furchig, mehr oder weniger orange gefärbt, 1 — 1.4 cm lang, 0.2 – 0.33 cm dick, mit einem Längsriss aufspringend.

Taeniophyllum rostellatum J. J. S. n. sp.

Planta parva, radicibus cortici adpressis, valde compressis, dilute sordide viridibus, c 4 cm. longis, 0.2 — 0.24 cm. latis. Inflorescentiae erectae vel patentes, pluriflorae, pedunculo filiformi, dense verruculoso-papilloso, sordide fuscescenti, c. 0.6 — 0.75 cm. longo, medio vaginula bracteiformi erecto- patente papillosa donato, rachide quam pedunculum crassiore, flexuosa, angulata, dense verruculoso-papillosa, colore pedunculi, c. 0.5 cm. longa, cum bracteis c. 0.175 cm. lata, internodiis vix 0.05 cm. longis. Bracteae persistentes, alternatim bifariae, patentes, margine superiore patentissimae, $^2/_3$ rachidis amplectentes, triangulae, conico-acutae, concavae, dorso papillosae, colore rachidis, novellae virides, c. 0.07 cm. longae. Flores parvi, c. 0.5 cm. longi, sepalis petalisque dorso furfuraceis. Sepalum dorsale erectum, subsigmoideum, apice recurvulum, ovato-lanceolatum, breviter subulato-acuminatum, 1nervium, c. 0.275 cm. longum, 0.075 cm. latum. Sepala lateralia patentia, apice recurva, convexa, elliptica, acuta, 1nervia, costa dorso prominente, c. 0.15 cm. longa, 0.075 cm. lata. Petala incurva, oblique ovato-elliptica, falcata, acutiuscula, concava, extus obtusangule convexa, 1nervia, c. 0.175 longa, 0.1 cm. lata. Labellum sub gynostemio horizontale, 3lobum, valde cucullato-concavum, postice rotundato saccatum et in calcar brevissimum obtusum contractum, parte postica membrana transversa verticali valde sigmoideo-curvata a lobo intermedio separata, bene 0.25 cm. longum, ab apice calcaris usque ad apicem ovarii c. 0.2 cm. metiens; lobi laterales parvi, incurvi, apice contigui, oblique oblongi, obtusi; lobus intermedius porrectus, latus, marginibus erectis incurvis cucullatus, retusus, rostellum aequans, c. 0.125 cm. longus. Gynostemium cum ovario angulum obtusum faciens, breve, latum, quadrangulum, basi utrinque in lobulum rotundatum dilatatum, usque ad apicem rostelli c. 0.2 cm. longum, clinandrio magno, concavo, apice truncato. Anthera magna, curvata, e basi ovata oblongo-truangulo-angustata, acuta, membranacea, c. 0.2 cm. longa.

Pollinia 4, inaequalia, globosa, cum stipite longissimo spathulato apice recurvo et bilobulo et glandula parva c. 0.22 cm. longa. Rostellum longissimum, porrectum, vix recurvulum, triangulum, angulato-canaliculatum, subtus convexum, acute bidentatum, obscure coloratum. Stigma magnum, basilare, transverse oblongum, obscure marginatum. Ovarium rectum, 6sulcatum, furfuraceum, c. 0.17 cm. longum.

Java: Priangan, Tjadas Malang und Tjisokan bei Tjibeber, in c. 1000 m und 750 m ü. d. M. (R. C. Bakhuizen van den Brink, bl. im Juli 1917; kult. in Hort. W. F. Winckel unter n. 326).

Eine sehr merkwürdige Pflanze, die sich bei keiner der anderen javanischen Arten näher anschliesst.

Herrn Winckels Notizen entnehme ich die nachfolgende Beschreibung der Färbung. Unpaares Sepalum und Petalen hellgelbgrün und schimmernd. Paarige Sepalen nahezu weiss, durchscheinend. Lippe schneeweiss. Säule grünlich, dunkelrot berandet, wie auch das Rostellum. Anthere blassgelb. Ovarium blassgrün, gegen die Basis gelblichweiss.

Beschreibung nach einigen in Formalin konservierten Blüten und einer lebenden Pflanze.

Taeniophyllum rostellatum J. J. S.

Kleine Pflanze. Wurzeln angedrückt, stark zusammengedrückt, hellgraugrün, c. 4 cm lang, 0.2—0.24 cm breit. Blütenstände aufrecht oder abstehend, mehrblütig; Pedunculus fädlich, dicht warzig papillös, graubräunlich, 0.6—0.75 cm lang, in der Mitte mit einem brakteeförmigen, aufrecht abstehenden, papillösen Schaftblatt; Rachis dicker als der Pedunculus, zickzackig, kantig, dicht warzig papillös, gefärbt wie der Pedunculus, c. 0.5 cm lang, mit den Brakteen 0.175 cm breit, die Internodien kaum 0.05 cm lang. Brakteen bleibend, 2zeilig, $^2/_3$ der Rachis umfassend, abstehend, am oberen Rande weit abstehend, dreieckig, kegelig spitz, konkav, aussen papillös, gefärbt wei die Rachis, die jungen grün, c. 0.07 cm lang. Blüten klein, c. 0.5 cm lang, die Sepalen und Petalen aussen kleiig punktiert. Unpaares Sepalum aufrecht, eirund lanzettlich, kurz pfriemlich zugespitzt, 1nervig, c. 0.275 cm lang, 0.075 cm breit. Paarige Sepalen mit zurückgebogener Spitze, konvex, elliptisch, spitz, 1nervig, die Mittelrippe aussen vorragend, c. 0.15 cm lang, 0.075 cm breit. Petalen eingebogen, schief eirund elliptisch, sichelig, spitzlich, konkav, 1nervig, 0.175 cm lang, 0.1 cm breit. Lippe unterhalb der Säule horizontal, 3lappig, stark kappig konkav, nach hinten abgerundet sackig und äusserst kurz stumpf spornförmig zusammengezogen, der hintere Teil innen durch eine vertikale, Sförmig gekrümmte Quermembran vom Mittellappen abgetrennt, gut 0.25 cm lang, von der Spitze des Spornes bis zur Spitze des Fruchtknotens 0.2 cm messend; Seitenlappen klein, eingebogen, an der Spitze zusammenstossend, schief länglich, stumpf; Mittellappen vorgestreckt, breit, durch aufrechte, eingebogene Ränder kappig konkav, eingedrückt, dem Rostellum gleich lang, c. 0.125 cm lang. Säule mit dem Ovarium einen stumpfen Winkel bildend, kurz, breit, viereckig, am Grunde beiderseits in ein abgerundetes Läppchen verbreitert, bis zur Spitze des Rostellum 0.2 cm lang; Clinandrium gross, konkav, vorn abgestutzt. Anthere gross, schwach konkav, gebogen, aus eirunder Basis länglich dreieckig verschmälert, spitz, häutig, 0.2 cm lang. Pollinien 4, ungleich gross, kugelig, mit dem sehr langen, spateligen, an der Spitze zurückgekrümmten und zweilappigen Stielchen und der kleinen Klebmasse 0.22 cm lang. Rostellum sehr lang, vorgestreckt, kaum zurückgebogen, dreieckig, stumpfwinkelig rinnig, unten konvex, spitz 2zähnig, dunkel gefärbt. Narbe gross, grundständig, querlänglich, dunkel berandet. Ovarium gerade, 6furchig, kleiig, 0.17 cm. lang.

Taeniophyllum hirtum Bl. Bijdr. (1825), 356; Lndl. Gen. et sp. Orch. (1833), 226; Miq. Fl. Ind. Bat. III (1855), 685; J. J. S. in Fl. Buit. VI, Orch. (1905), 622.

Caulis abbreviatus, squamatus, radicibus numerosis, elongatis, compressis, c. 17—23 cm. longis, 0.15—0.22 cm. latis. Inflorescentiae laxe pluriflorae, pedunculo filiformi, manifeste irregulariter sicco cinnamomeo-muriculato, c. 2.8—5 cm. longo, nonnullis vaginulis brevibus donato, rachide filiformi, flexuosa, angulata, parce muriculata, c. 1.2—5.5 cm. longa, internodiis c. 0.2—1.3 cm. longis. Bracteae alternatim bifariae, rachidem amplectentes, patentes, late triangulae, acutae, concavae, muriculatae, dorso ad c. 0.17 cm. longae. Flores c. 6—15, succedanei, carnosuli, c. 0.95

cm. longi, sepalis divergentibus, apice recurvis. Sepalum dorsale late lineare, obtusum, apiculatum, concavum, 3nervium, c. 0.54 cm. longum, 0.13 cm. latum. Sepala lateralia oblique lineari-lanceolata, breviter acute apiculato-acuminata, concava, dorso convexo-incrassata et in costa media leviter verruculosa, praesertim apicem versus carinata, 3nervia, c. 0.55 cm. longa, 0.125 cm. lata. Petala oblongo-ovata, apice recurvula, obtusa, vix apiculata, concava, subcarinata, 3nervia, c. 0.5 cm. longa, 0.18 cm. lata. Labellum simplex, calcaratum, subundatum, totum c. 0.875 cm. longum; lamina lateribus incurvis valde concava, subtus convexa, inferne subventricosa, crassiuscula, 5nervia, nuda, explanata rhombea, utroque latere rotundata, apice triangulo-subacuminata, subacuta, c. 0.5 cm. longa, 0.4 cm. lata; calcar reversum, ovario adpressum, subrectum, lateraliter compressum, clavato-subfusiforme, apice vix contractum, obtusum, c. 0.375 cm. longum. Gynostemium brevissimum, paulo lateraliter compressum, apice truncatum, c. 0.08 cm. longum, auriculis rotundatis, approximatis, parallelis, verticalibus, extus convexis. Anthera cucullata, subsemiglobosa, in rostrum magnum lineari-oblongum breviter acute acuminatum cum anthera angulum obtusum faciens medio valde recurvum supra convexum subtus concavum producta, tota inexplanata c. 0.15 cm. longa. Rostellum inter lobos gynostemii absconditum, submalleiforme. Ovarium pedicellatum parce furfuraceum, c. 0.67 cm. longum. Capsula cylindrica, basi apiceque attenuata, leviter sulcata, nuda, c. 1.75 cm. longa, 0.475 cm diam., pedicello c. 0.2 cm. longa.

Java: Priangan, Gede bei Tjibeureum, in c. 1450 m ü. d. M. (Blume). Gegerbintang. (Blume). Poentjak, in c. 1400 m ü. d. M. (J. J. S., fr. im Juli 1908). Bandoeng, Kawah Kamodjan in c. 1500 m ü. d. M., im feuchten, dunklen Walde. (W. Docters van Leeuwen n. 2420, bl. und fr. im September 1916). Goenoeng Beser bei Tjibeber in c. 1200 m ü. d. M. (W. F. Winckel, bl. im Juni 1917).

Nach einer Notiz von Herrn Dr. W. Docters van Leeuwen sind die Blüten orangegelb; bei einem Exemplar, das ich in Tjidadap sah, waren sie gelb.

Beschreibung nach getrockneten und in Alkohol konservierten Pflanzen.

Bulletin du Jardin Botanique de Buitenzorg.

Deuxième Série.

No. I. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 3.
„ II. Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. IV. Dr. E. Rosenstock. Hymenophyllaceae Malayanae.
„ III. W. und J. Docters van Leeuwen—Reynvaan. Einige Gallen aus Java. Sechster Beitrag.
Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels. V.
Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. V.
„ IV. Dr. A. Rant. Ueber die Djamoer-Oepas-Krankheit und über das Corticium javanicum Zimm.
„ V. Dr. W. Staub. Weitere Untersuchungen über die im fermentierenden Thee sich vorfindenden Mikroorganismen.
„ VI. P. A. Ouwens. On a large Varanus-species from the Island of Komodo.
P. A. Ouwens. On a Chlamydosaurus from Dutch South New Guinea.
„ VII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 4.
„ VIII. Dr. J. J. Smith. Die Gruppe der Collabinae. Noch einmal Glomera Bl Dendrobium Sw. Sect. Cadetia. Bulbophyllum Thou. Sect. Cirrhopetalum. Die Gruppe der Podochilinae. Neue Orchideen des Malaiischen Archipels. VI. Vaccinium malaccense Wight var. celebense J. J. S. Vorläufige Beschreibungen neuer Papuanischer Eriaceae. Einige Ausbesserungen.
„ IX. Dr. J. J. Smith. Die Orchideen von Java. Dritter Nachtrag.
„ X. H. Karny und W. und J. Docters van Leeuwen—Reynvaan. Beiträge zur Kenntniss der Gallen von Java. 5. Ueber die javanischen Thysanoptero-Cecidien und deren Bewohner.
„ XI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 5.
„ XII. C. A. Backer. On some results of the Botanical investigation of Java (1911—1913).
„ XIII. Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels VII.
„ XIV. Dr. J. J. Smith. Die Orchideen von Java. Vierter Nachtrag.
„ XV. W. und J. Docters van Leeuwen-Reynvaan. Einige Gallen aus Java siebenter Beitrag.
„ XVI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 6.
„ XVII. Palmiers du Jardin Botanique de Buitenzorg.
„ XVIII. Dr. A. Rant. Ueber die Mopokrankheit junger Cinchonapflanzen und über den javanischen Vermehrungspilz.
„ XIX. Andreas Sprecher. Same und Keimung von Hevea brasiliensis.
„ XX. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 7.
„ XXI. W. und J. Docters van Leeuwen-Reynvaan. Niederländisch Ost-Indische Gallen No. 8. Beschreibungen von Gallen aus Sumatra und Simaloer No. 9. Beschreibungen von Gallen aus Celebes und aus den Inseln südlich von Celebes.
„ XXII. Dr. A. Rant. Der graue Wurzelpilz von Cinchona.
„ XXIII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 8.
„ XXIV. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting. Malayan Ferns 9.
„ XXV. Dr. J. J. Smith. Orchidaceae novae Malayenses VIII.
„ XXVI. Dr. J. J. Smith. Die Orchideen von Java. Fünfter Nachtrag.

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

1918

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU
COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

JAN 18 1920
National Museum

DEUXIÈME SÉRIE.

N°. XXVII.

Dr. Th. VALETON Sr.

NEW NOTES ON THE ZINGIBERACEAE
OF JAVA AND THE MALAYAN ARCHIPELAGO

1922
3.92

NEW NOTES ON THE ZINGIBERACEAE OF JAVA AND MALAYA.

BY

Dr. TH. VALETON.

PART I.

§ 1. In a preceding paper on the *Zingiberaceae* of Java [1] I gave the results of a study of living specimens collected by myself in some woods of West Java (mt Salak, Mt Gedeh and jungle of Depok) and in the Bot. Gardens of Buitenzorg. Dried materials were put practically aside; and only part of the genera was dealt with.

The following report is to contain some completions to the former treatise, in the first place a survey of those genera then passed over and further the result of the examination of the Buitenzorg Herbarium as to the Zingiberaceae of Java (collections of KOORDERS and BACKER), the Malayan archipelago, of which the materials are still very scanty, and of the species cultivated in the Bot. Garden.

The first part is to contain the genera *Curcuma, Gastrochilus*, *Kaemferia* and *Zingiber*.

The genus *Curcuma* has been dealt with in a more ample way than the other genera.

This ampleness is a consequence of the following facts. Sometime before my resignation as a curator of the Herbarium, in 1913, Mr. HEYNE, curator of the Museum for economical Botany, applied to me for the determination of the numerous kinds of *Curcuma* rhizomes sold in the native bazars and provided me with flowering materials of a good many species.

There existing already a rather extensive literature about this genus among which the splendid pictures of ROSCOE, the detailed descriptions of ROXBURGH and WALLICH, the monograph of K. SCHUMANN, the Flora of Indo-china by GAGNEPAIN, the Exkursionsflora of KOORDERS, the task seemed not a very difficult one. It appeared however that the javanese species were very insufficiently known, that the majority of the cultivated species were endemic or at least not to be reduced to any of the descriptions or pictures existing of asiatic species, that the keys and descriptions in SCHUMANN's monography were useless for javanese species and that even the Java "Turmeric" or "kunyit", though already described in an excellent way by RUMPH and KOENIG, had to be renamed and described again, because none of the recent descriptions quoting those two authors agreed with the plant in question.

---

[1]) Vide Neue und unvollständig bekannte Zingiberaceae aus West-Java, Bulletin de l'institut botanique de Buitenzorg No. 20, 1904.

It appeared to me that from a cursory determination of the existant material no good result was to be expected, and Mr. HEYNE with his wellknown thoroughgoingness proposed to me to lay out a culture garden, where all available *Zingiberaceae* of economical interest were to be grown and in this way to procure me living material which might be studied at leisure.

This plan was executed and proved efficient. With a few exceptions the species of *Curcuma* have flowered, and far the largest part could be examined in a living state. As might be expected the majority of the cultivated forms proved to be new to science and many of them represented quite new and well distinct species.

The abundance of materials induced me to study this genus in a more explicit way than is done commonly in a systematic report.

A very appreciated complement for my study with respect to the spontaneous growing species I received by the kind assistance of Mr. BEEKMAN, Director of the Exp. Stat. of Forestry, under whose supervision specimens of all *Curcuma* species available in a flowering state were collected in the principal teak forests of Java by Mr. KALSHOVEN, Assistant conservator of forests, who acquitted himself in a very satisfactory way of his task. Some new species and interesting information about the distribution I thank to his investigations.

For the knowledge of some wild growing species of the tableland of Mt Yang I am indebted to Mr. JESWIET, subdirector of the Oost-Java Agricultural Station, who provided me with splendid living and well preserved materials.

At last I have to thank Mr. Hj. JENSEN, Director of the Klaten Agricultural Station for flowering material of some species, sold in the native market of Djogja, wanting in our gardens and cultivated by himself.

Among the new species described below there are two, viz. *C. Heyneana* and *C. Mangga*, bearing the authornames VALETON and VAN ZIJP. This is due to the fact that when applying for information to Mr. v. ZIJP, pharmacist in Malang, at the same time a collaborator in the scientia amabilis, a pupil of Prof. Dr. WENT in Utrecht, about a new *Curcuma* described by him (1815, 340), which information was given willingly, I was informed that Mr. v. ZIJP was since a long time occupied in growing and studying the *Curcuma* species sold on the bazars. He told me that at that very moment he was about finishing a study of the two species above named known by the native names "giring" and "temu mangga", to be published in the „Kruidkundig archief".

I proposed to Mr. v. ZIJP to compare our studies of those two species and to make up a description of them and baptise them in common.

Mr. v. Zijp consented and so the latin descriptions of the two above named species which certainly belong to the best ones of the paper, are due to our combined efforts. Also about some other species dealt with, Mr. v. Zijp provided me with some valuable information.

§ 2. Some notes about the descriptions.

A valuable factor in the descriptions of *Zingiberaceae* is the colour not only of the flower but also in some genera of the rhizome. This factor is commonly not used in specific diagnoses, very often taken from dried material, where colours of course are not of any use. In *Curcuma* and *Zingiber*, however, colour often belongs to the essential diagnostical helps and some species resembling one another very much in a dried state may be distinguished with certitude if the colours have been noticed by the collector (see at Z. Zerumbet). There, however, exists among botanists a certain vagueness in the designation of colours which troubles the clearness of the diagnoses.

In order to obtain objective designations indispensable in diagnoses I have made use of the "Code des couleurs" by Klincsiek et Valette (Paris Paul Klincksiek, 1908), where 720 colours arranged systematically are indicated by ciphers.

In this "repertory" Klincksiek accepts 24 principal colours which are obtained by dividing the spectre, in 12 divisions, 4 for every simple colour of the spectrum, to wit: red, orangered, orange, orange yellow (yellow, yellow green, green, greenblue) blue, violet-blue, violet, violet red; which are divided once more each in a more pure and a somewhat nuanced state. These 24 normal colours ("couleurs normales") are diluted ("eclaircies") into 4 degrees, making 96 new "tones" and these 120 tones are "abated" ("rabattus") by mixing them with equal portions of black in the same way in 4 degrees. From this proceeding result 24 × 25 = 600 colours (= 100 modifications of each of the spectral colours) which are exposed in 24 double pages each containing 25 colours, and numbered from 1—600.

Each group of 25 specimens contains one of the normal colours placed on the left hand at the top of the page, each of the vertical columns contains the four dilutions and each horizontal column the four abatements of the same colour. Thus pure red is represented by number 1; red, nuanced, by number 26; red-orange by number 51; red-orange, nuanced, by number 76, orange by number 101 and 126, orangeyellow by number 151 and 176, yellow by 201 and 226, etc. etc.

Pure red once diluted is 6, twice diluted is 11, thrice diluted 16 etc. Pure red once abated is 2, twice abated 3 etc.

Pure red once diluted and once abated is 7, twice abated 8 etc.

Because all the numbers are distanced 1 in the horizontal and 5 in the vertical columns, every number which ends in 1 or 6 belongs to the first, not abated, column, all those of the second, once abated range, end with 2 or 7, all those of the 5th, 4 times abated range, end with 5 or 0.

The hundred first numbers contain all derivations of red, gradually more mixed with orange, unto orange, the second hundred those of yellow, the third century all blue etc. Thus 213 is the second abatement of a dilution of yellow 201, and because 206 is the first dilution, and 211 the second dilution 213 is the second abatement of the second dilution of yellow.

In this series the much diluted tinges are scantly represented. Therefore another 120 numbers, 5 on each page, are added indicating the very bright tinges, the first of which, on the first column, is derived from the normal colour and has the same cipher as the most diluted one of that column, augmented with a zero, so the 4th dilution of red is 5, the fifth is 05, the 4 that follow are dilutions of the second abatement of that colour, their gradations indicated by the letters A. B. C. D. Thus 3 D is a dilution of the second abatement of red.

For those of my readers to whom this booklet is not available I give here a survey of the numbers and names used in the "Chromotaxia" of SACCARDO, comparing them with some of the most important ciphers, derived from the "Code", used in this treaty.

I. Red and brown colour. (1 — 100. Code). The pure red colours, 1 and 26, with their dilutions are wanting in SACCARDO. They occur however in the fruiting spikes of *Zingiber* species.

Ruber, Red, Sacc. 14 is orange-red, Cod. 76, 81, and related tinges. *Miniatus*, Scarlet, Sacc. 15 is very near to Cod. 68 = twice diluted orangered. *Incarnatus*, Flesh-colored, Sacc. 16, is about 96 = fourtimes diluted orangered. *Roseus*, Pink, Sacc. 17, is about 21, fourth dilution of pure red, but there are also many dilutions of red violet, which may be named "pink" or "rose-coloured" e.g. 596 and related colours. *Testaceus*, brick-coloured, Sacc. 18, is about 87 = red-orange once abated, twice diluted; and numerous related colours. *Latericius*, brick-coloured, Sacc. 19 is the same once more abated = 88. *Badius*, Bay, Sacc. 20 = 59. *Castaneus*, chestnut coloured, Sacc. 10, = 54 and 78.

II. Orange colours, (101 — 200 Code).

Aurantiacus, orange-coloured, Sacc. 21 = 126 and 131. *Luteus*, egg yellow, Sacc. 22 = 151. *Flavus*, yellow, Sacc. 23 = 176. *Ochroleucus*, yellow-whitish, 28 = 166. *Ochraceus*, ochre-yellow, Sacc. 29 = 136 and 141. *Cremens*, cream coloured, Sacc. 27 = 171 (diluted). *Stramineus*, Straw colored Sacc. 26 = 0196. Here belong also most tinges of brown: *Umbrinus*. Umber. Sacc. 9 = 128 and 133. *Isabellinus* leather coloured, Sacc. 8 = 127. *Avellaneus*, drab, Sacc. 7, near 147. *Fulvus*, Tawny, Sacc. 32 = 112. *Ferrugineus*, Rusty, Sacc. 31 = 107. *Melleus*, amber coloured, Sacc. 30 = 182. *Ater*, blackish, Sacc. 4 = 124 *Olivaceus*, olive green, Sacc. 39 = 180.

Fuligineus, sooty Sacc. 11 = 154 and 455, and *Fumosus*, smoky, Sacc. 6 the same colour, but very much diluted.

III. Yellow colours (201 — 300). *Citrinus* = lemonyellow Sacc. 24 = 201, pure yellow-*Sulphureus*-brimstoneyellow Sacc. 25 = 226, second yellow-*Flavovireus* Sacc. 33 = 251, green-yellow.

IV. Green colours; (301 — 400): *Viridis* Sacc. 35 = 301 and 326, pure green. *Prasinus*, smaragdine Sacc. 36 = 311-*Aerugineus*, verdigris = 336 and 341, resembles also 366, 397, 353 D. This color with different tinges occurs in young rhizomes of *C. aeruginosus*.-*Atrovirens*, Darkgreen Sacc. 34 is the deepest abatement of green 330. *Glaucus*, seagreen Sacc. 38 is about 378 A.

V. Blue colours; (401 — 500): *Cyaneus*, brightblue, Sacc. n. 41. is not as pure as 401 and 426.- *Caeruleus*, pale blue Sacc. 42 = 411.- *Caesius*, eyeblue is 428 B and 428 C, both dilutions of the second abatement of pure blue. *Atrocyaneus*, prussian blue, Sacc. 40 = 430, fourth abatement of the second pure blue, but 455 and 480, abatements of violetblue answer as well.- *Plumbeus*, lead coloured Sacc. 44 = 423.- *Ardesiacus* Sacc. 45 = 425.

VI. Violet colours (501 — 600). *Violaceus*, violet Sacc. 47 is 512 (once abated, twice diluted violet, while the more pure purple tinges 501 — 521 and 526 — 546 are wanting in SACCARDO)-*Atroviolaceus*, darkviolet Sacc. 46 is about 528-*Vinosus*, vinous, Sacc. 50 is one of many tinges of red violet, 551 etc.- *Lividus*, livid Sacc. 49 = 567-*Lilacinus*, lilac Sacc. 48 a very light pure violet 0546-*Purpureus*, blood-coloured Sacc. 13 = 576, red-violet. *Atropureus*, Dark purple. Sacc. 12 is a much abated red-violet = 554, etc.

Curcuma Linn. [1]).

Linn. Musa Cliffortiana (1738), excl. description.

§ 1. **Diagnose.** This genus is perfectly defined by two of its characters, viz. the Structure 1e. of the staminal apparatus and 2e. of the inflorescence. The inflorescence is a strobilaceous spike consisting of numerous large concave bracts adnate with the lower half of their inner margins to the backs of those immediately above and forming pouches which contain two to seven flowers each, embraced laterally by their membranaceous cymbiform bractlets and composing a sessile cicinnus, the flowers of which expand successively. The uppermost bracts of the spike are longer than the mean bracts and differently coloured while some of the top ones are always sterile.

---

[1]) According to DRYANDER (1793, 212), the definition of *Curcurma* given by LINNAEUS in Musa Cliffortiana (1736) and in Gen. Plant, (1797), etc. does not refer to the two species named in spec. Pl. (1753) but to the figure of RHEEDE (1692, 11 t. 11), representing: *Kaemferia pandurata* L. Therefore *Curcuma* L. is strictly speaking a synonym of Kaemferia. But LINNAEUS comprehended under this name also *C. longa* and other true species of the genus, and therefore the name *Curcuma* may be retained, under refutation of the description.

An analogous inflorescence is only to be found in *Hitchenia.*

The staminal apparatus consists of the stamen accompanied on either side by a petaloid staminodium, connate sideways with the filament near its base, and of the labellum which is applied and a little adnate with its margins to the edges of the staminodes and consists of a large petaloid obovate or almost circular disk with a thickened longitudinal bar in the center, and of which the side parts are erect so as to form a wide channel while the small endlobe is more or less protruded or recurved.

The structure of the stamen is very characteristic (see page 24). The filament is short and broad, *constricted at the top and attached to the back of the connective* in such a way that the anther is *versatile.* The thecae are parallel, contiguous, but embracing the style between them, linear, straight or bent backward along the base of the anther, dehiscent in front and having very thick and fleshy back- and sidewalls, from which are springing in most of the species the short or long awlshaped spurs. These are however *not essential* to the diagnosis of the genus, being wanting in a few species. Almost all authors however who deal with this genus have considered this character as essential. On the other side the dorsifix versatile anthers, already mentioned and depicted by FORBES but neglected by all other anthors, should be considered as such, for they always go together with the other important characters of the genus.

The pollen in this genus is globose, smooth, rather large and cohering by means of a glutinous substance, not soluble in water, forming large bandshaped rather loose pollinia

§ 2. **Subdivision.** In his survey of the Indian *Curcuma* spec. in HOOK. f. Fl. Br. Ind., BAKER divided the Asiatic species in three groups or sections: *Exantha, Mesantha* and *Hitcheniopsis.* The first section contained those species where the inflorescence was distinct from the leafstem, the second those where the bracts were adnate only near their base while the greater part was extant and free; the third those where the bracts were adnate for a large portion of their length, while the free tips were recurved. In both the last named sections, the inflorescence was central.

This last section was based principally on *Curcuma Roscoeana,* Wall (1830 t.9), which, according to BENTHAM in Genera Plantarum (1880, 643), ought to be transferred to *Hitchenia,* as has been done by PETERSEN 1868 II 6.16. SCHUMANN in his monography has followed BAKER in the subdivision of the genus but he added as a diagnostic character of *Hitcheniopsis* the wanting of spurs to the anthers. He takes however in this subgenus among others C. *petiolata* Roxb., notwithstanding this species has calcarate anthers as may be seen in the 4 figures quoted by himself, and, according to HOOKER (Bot. Mag. 5431), the bracts are adnate to the middle, not to the top. His diagnose of the subgenus is therefore of no use, the more so because also the primary character based on the proportion of the adnate part of the bracts to the free parts is very vague and practically useless.

The species combined in this group by SCHUMANN, following BAKER, RIDLEY and GAGNEPAIN, are very heterogeneous, and some of them manifestly are wrongly placed in this genus. They are:

C. petiolata, Roxb., *C. cordifolia*, Wall., *C*, *Roscoeana*, Wall., *C. parvifolia*, Wall., *C. alismatifolia*, Gagn., *C. sparganifolia*, Gagn., *C. gracillima*, Gagn., *C. Kunstleri*, Baker, *C. lanceolata*, Ridl., *C. sylvestris*, Ridl.

Having been able to examine some of them in a living state, other ones by Herbarium specimens, and some ones from the excellent plates and descriptions of WALLICH I will shortly review these.

1 and 2. The first named species: *C. petiolata*, Roxb, and *C. cordata*, Wall, considered as synonyms by BAKER and K. SCHUMANN, are true *Curcuma-species*, showing all principal characteristics of the genus.

3. *C. Roscoeana*, Wall. has some resemblance with *Curcuma* in the (adnate?) pouch-forming bracts and the versatile anther with a short filament. But here the resemblance ends and the differences are as follows:

Spike: No coma, all bracts rigid, red, erect with a much recurved top (free, according to WALLICH, except at the broad base, adnate with the edges, according to BAKER).

Petals: Dorsal lobe not cucullate.

Staminodes: ovate, subdistant, not connate with the filament.

Labellum: simple, not lobed, not concave, with two elevated lines in the center, *including* a *median groove.*

Anther: Terminal, articulate to the filament with a broad base; thecae distant much shorter than the large connective which ends in a membranaceous, ciliate crest.

Decidedly this is not a *Curcuma*. Perhaps BENTHAM was right in reducing it to *Hitchenia*, but the essential characters of that genus are still very vague.

4. *C. parviflora*, Wall. Here the spike certainly resembles much that of a true *Curcuma*, for there is a distinct, white coloured coma, the flowerbracts seem to be connate, forming true pouches and the flower resembles that of *Curcuma* by the enlargened faux and subfornicate dorsal petal.

Still I think the most important characters of Curcuma are wanting. The *petals* converge behind the stamen and *staminodes*. The latter ones are *free* from the filament and seem to be placed in an exterior cycle. The labellum is patent, recurved, *not lobed* not concave, *without erect side parts* and central bar, but also without a median groove.

Anther: *terminal* subarticulate and nutant *with* a *broad base*, very short thecae (opening by pores?) and a very large fleshy connective prolonged into a considerable crest.

Moreover the habit is that of a *Gastrochilus* and the violet lip with radiating white lines shows more relation to that genus than to *Curcuma*. At all means it is to be excluded from *Curcuma*.

5 *C. alismatifolia* Gagnep.! 1908, 57 (v.s. Herb. mus Paris 343) has at first look a rather striking resemblance to a true *Curcuma* because of the long pink coma lobes. On the other hand it resembles *C. parvifolia* by the violet colour of the labellum and the shape of the bracts, both rather different from a true *Curcuma*. The central furrow in the lip points also more to a *Gastrochilus* then to a *Curcuma* but it reminds *C. Roscoeana*. The stamen differs as well from that of *C. parviflora* as from a true *Curcuma*. The narrow parallel thecae of the rather long crested anther are attenuate at their base into a kind of spurs and the connexion with the filament is at the backside near the base, probably it is nutant. The pointed thecae remind some species of *Gastrochilus*, but also *Curcuma meraukensis*.

6. *C. sparganifolia* Gagnep.! 1908, 59 (v.s. Herb. mus Paris, 30). Here the bracts of the spike *are quite free* one from another and herein they differ essentially from those of *Curcuma*. The anther with the shortly pointed thecae, is evidently *terminal*. The staminodes *are free* from the filament. The labellum is entire, orange-coloured in the centre.

7. *C. gracillima* Gagnep.! 1908, 59 (v.s. in Herb. mus Paris, leg. PIERRE and HARMAND.) Here the bracts are all alike, erect, with extant subacute tips. The anther is not spurred, shortly crested, wether it is terminal or versatile is unknown.

The lip is *bilobed*. Colour unknown.

The three last named species have in common a very curious peculiarity: The stylodes at the bottom of the flower are failing; at least they are not to be observed in the dried flower, as was stated by GAGNEPAIN and as I could persuade myself by examining flowerbuds of the above cited materials. This peculiarity was never observed in any species of the Order, except by GAGNEPAIN in *Kaemferia cuneata*, Gagn. (1905, 546) a species very near to *K. elegans*. I, however, am almost sure that if living materials were examined, these organs, either very small or connate with other organs, would be found. Now I think it a very important circumstance, communicated by WALLICH that in the living flower of *C. Roscoëana* the stylodes or nectaries are exceedingly small and only are to be traced by their yellow colour. Undoubtedly this shall prove to be the case in the above named species, and it evidently indicates a certain relation between the three here named species and *C. Roscoeana*.

8. *C. sylvestris*, Ridl (1893, 73) (v.s. Herb. mus Paris ex herb. PIERRE!) Slender creeping rhizome. Scape accompanied by a solitary leaf. Flower resembling that of a *Gastrochilus* with terminal anther, with a recurved violet crest, and an emarginate lip with a yellow central spot and violet

streaks on the lobes. Evidently no *Curcuma*, most probably a *Gastrochilus*, though reduced by RIDLEY to Hitcheniopsis.

9. *Curcuma lanceolata*, Ridl. 1908, 22. In this badly known species the bracts are ovate, green; the anther is terminal, the staminodes are much smaller than the coroll lobes. Lip white, apex yellowish, sides barred crimson. Evidently no *Curcuma*. Probably a *Gastrochilus*.

10. *Curcuma Kunstleri*, Baker (v.s. comm. e Herb. Perak, Temanggo leg. RIDLEY!; v.v. cult. in Hort. Bog. olim missa ex Singapore! sub „Kaemferia spec.").

The study of living specimens of this species persuaded me that its ranging in *Curcuma* is a perfect mistake brought about by a superficial likeness of the spikes in dried specimens. Really it does not possess one single characteristic of this genus, as I have discussed below (see under *Gastrochilus*).

I believe I may conclude from this review, that the 10 species of *Hitcheniopsis* do not constitute a natural group. Two of them *C. petiolata* and *C. cordifolia* are true *Curcuma* species. The remaining eight have in common the more or less strobiliform inflorescence, which however shows a rather different construction in the single species, the terminal anther (perhaps with exception of *C. sparganifolia* and *C. alismatifolia*), and the wanting of spurs to the connective.

Provisionally I think they must remain together forming a rather dubious group, *Hitcheniopsis*, which might be put as an Appendix to *Gastrochilus*. None of them occur in the Archipel.

As to *Curcuma petiolata*, Roxb. which is cultivated in Java and of which I examined living specimens, I found them different in some characters from the *Curcuma* type. This species is very nearly related to a recently discovered species: *C. aurantiaca*, van Zijp, conspicuous by the *absolute wanting of the spurs*. Together they form a very natural group, being distinguished from the other Javan species by several more or less important characters.

The most important of these consists of the structure of the anther (compare page 25). Here the spurs are either wanting or very short, while the thecae run down along the face of the spurs or where these are wanting, are bent backward along the base of the anther. Moreover the anther is not attached to the filament about the middle of its back as in the other species but very near the base though it is dorsifix and versatile, just as there. A second point of difference is furnished by the staminodes, which in the main of the species are longitudinally grooved, with a complicated top so as to be folded up under the margins of the large and hooded fornicate dorsal lobe of the corolla. In the present species these are straight not or very little folded, and, in the expanded flower, are larger than the dorsal lobe. As a character of less value I consider the bracts which are very numerous and at least in the lower half of the spike are connate to a little above their middle, and the coma-bracts which do not extend much beyond the floral bracts.

The rather long pouches give them a superficial resemblance to *C. Roscoeana* but on the whole they do not differ so much from the *Curcuma* type.

Studying the descriptions and plates of the numerous species of *Curcuma* known till now I found that several of them are receding from what I consider as the original *Curcuma* type in the same way as the above named species. Thus the genus can be divided into two subgenera which I propose to call *Eucurcuma* and *Paracurcuma* (= Hitcheniopsis Baker ex parte). Beyond the species named above, *C. aurantiaca, C. petiolata* and *C. cordifolia,* here belong: *C. meraukensis* Val. and *C. latifolia* Val. (VALETON, 1913, 924 tab. 79 B. and C). In both these species but the most distinctly in *C. meraukensis* the spurs are appendages of the base of the cells and in the latter they show even much resemblance with those of *C. alismatifolia* Gagn.; for the rest flower and inflorescence agree with that of *C. petiolata.*:

C. australasiaca, Hook. f. (1867 t 5620).

C. montana, Roxb. (1807 8,355.), Roxb. Cor. pl. II (1798, t 151).

These two species, as already said by HOOKER, are very nearly related, and both have a great resemblance to *C. petiolata.* Of the second there exists a detailed figure by GRIFFITH (1853, 3, 415, t. 352) and here, as seen in fig. 3 the cell seems not to be limited by a wall below but continues on the lower margin. Also the figure given by ROXB. shows a great resemblance to *C. petiolata.*

C. longa, Bentl. and Trim. (non aliorum) (1886, 269).

Both the apparently rather good figure, drawn from a plant, flowering in the botanical Gardens at Kew, and the description, point to a species very different from *C. longa,* Koen. which latter according to ROXBURGH (see below) is the original plant of the "turmeric". The kew plant belongs apparently to the species which according to B. and Tr. was introduced into the English stove by P. MILLER in 1759, and which might be seen at that time (1886) in most botanic gardens. It may have given origin to much confusion; and it seems to me quite probable that it is this species that caused HOOKER to insist on the resemblance between *C. australasiaca* and *C. longa.*

§ 3. Survey of the Javan species of Curcuma.

A. *Paracurcuma*: Bracts often very numerous, connected at least partly beyond the middle. Spike cilindrical, with comparatively short bracts of the coma. Bracteoles small, staminodia straight, larger than the dorsal petal which is somewhat cucullate, obtuse or with a short concave top, not clasping the staminodes, except in *C. cordifolia* Wall. Anthers attached near the base, not or very shortly calcarate, spur not longer than a quarter of the anther, grooved on the face, as a continuation of the loculi; appendix of the connective forming a short cup which encloses the stigma entirely or its base. Stem short; leaves spreading, short-or long stalked, the base mostly rounded. Ligula large, forming an ovate auricle on both sides of the base of the petiole. Rhizome short or wanting, bulbs or tubers in groups.

C. *aurantiaca*, V. Zijp.
C. *petiolata*, Roxb.

B. *Eucurcuma.* Bracts mostly not adnate over the middle; only in *C. colorata* Val. this is the case with the lowest floral bracts. Bracts of the coma mostly extant far beyond the floral bracts. Staminodia longitudinally grooved, folded under the cucullate and pointed dorsal lobe. Anthers calcarate; spur attached with a fleshy base to the back of the cells. Connective rounded or narrowed towards the top, not lengthened to a cup, sometimes slightly produced between the loculi; anther attached to the filament at the back about the middle; outer wall of the thecae prolonged at the lower end to a small tubercle, the cell not continuous along the lower side, or in some species of the Exantha, only as a narrow furrow, not containing pollen.

Full-grown leaves acuminate at the base, Ligula without elongated auricles. Rhizomes lengthened, consisting of merithallia and forming lateral branches. Fourteen species in Java, two in Sumatra.

These are combined into two sections:

I. Mesantha: Inflorescence originating from the centre of the foliate stem.

C. *domestica*, Val.
C. *purpurascens*, Val.
C. *viridiflora*, Roxb.
C. *colorata*, Val.
C. *euchroma*, Val.
C. *soloensis*, Val.
C. *Brog*, Val.
C. *ochrorhiza*, Val.

II. Exantha: Inflorescence originating laterally from the rhizome, non foliate.

C. *Zedoaria*, Roxb.
C. *xanthorhiza*, Roxb.
C. *phaeocaulis*, Val.
C. *aeruginosa*, Roxb.
C. *Mangga* Val. et v. Zijp.
C. *Mangga*,
Var., *rubrinervia*, Val.
C. *Mangga*,
Var. sylvestris, Val.
C. *Heyneana*, Val. et v. Zyp.
C. *Lörzingii*, Val.

§ 4. Compendium of the characters of the genus, which are important to the distinction of the species.

I. Stem and leaves.

The similarity of the habit and the resemblance of the leaves of the *Curcuma* species is so great that it is often very difficult to see the difference between two not flowering species even in living plants and mostly quite impossible in the herbarium. The following points may be considered.:

1th Average height of the spurious stem or lenght of the sheaths, and position of the leaves.

2d Transition of the sheath to the petiole with the ligula.

3d Length of the petiole.

4th Shape of the leaf and average proportion between length and breadth.

5th Pubescence.

6th Colour of the leaf.

1. The *Paracurcuma*-species are at once distinguishable from the Eucurcuma species by the shortness of stem and the more or less spreading or pendent leaves of *Gastrochilus*-habit. The lateral and central flowering species are not distinguished by a constant character.

In both groups the stem consists of a number of white or reddish scales, which grow in length to the centre, the innermost shaped as leafsheaths without a blade, with a rounded and scariose-edged top, the alternate broad sheaths of the leaves, conduplicate and imbricating at the base, form the much flattened spurious stem. In valid specimens of all *Eucurcuma*-species the leafblades are nearly erect; but generally the structure is stronger in the lateral species and upon an average they are taller.

The outer leaves are sessile in the lateral, shortly petioled in the central species, the petioles of the following and inner leaves are gradually growing longer like the leaves themselves, but those of the lateral species are shorter than those of the central species.

2. The transition of the petiole to the sheath is very uniform. Everywhere the petiole is canaliculate and is subabruptly dilated at the base to the broad conduplicate sheath. The ligula forms there a narrow membranous strap on the inner side, consisting of two lobes which converge in the middle with a blunt angle or with a downward convex bow, and are confluent on the outer side with the broad membranous margin of the sheath. In *Eucurcuma*-species the sheath passes gradually into the petiole. In Javanese *Paracurcuma*-species the margin with the ligula is elongated upwards to an ovate lobe or auricle on both sides, which may reach a length of 10 m.m. in *C. aurantiaca*. (in *C. petiolata* about 3 m.m. In *C. domestica* the margin of the sheath (including the ligulalobes) is laterally produced but is not upward elongated. In the sessile or short-petioled oldest leaves of all species the lobes are almost in a straight line, so as to form a circular band. The apex of the sheath (with the ligula) is commonly ciliated at the edge, densely in *C. Mangga* and *C. Zedoaria* and sparsely (nearly glabrous) in *C. Heyneana*. The characteristic differences are only to the seen in young fresh leaves. They are seldom of any use for the determination of dried materials.

3. The size of the leaf and the length of the petiole are very relative. In the lateral species and also in some others *(C. purpurascens)* the oldest leaves are sessile and, since in herbarium material often only a few leaves are to be found, this gives occasion to incorrect definitions (see *C. aeruginosa*). The petiole increases regularly as the plants become older. It is of no use to mention the dimensions of the leaves as commonly is done in the diagnoses unless the length and width at least of one of the oldest and of the youngest leaves, is given.

4. Some species may be recognized by the absolute size of the leaves (see the definitions). So *Curcuma domestica* has the smallest leaves among the *Eucurcuma*-species known to me, rarely surpassing 400 mm. mostly smaller.

C. xanthorhiza has the largest leaves; blade to 1200 mm. long, the whole plant to two meters. In *C. Zedoaria* and *C. aeruginosa* the leaf reaches at the utmost 1 meter in length.

Regarding the relative length and breadth of the leaves it is a constant rule that the first appearing leaves of a plant are broader and with a broader base than the later formed. Especially about the end of the rainy season the leaves become considerably narrower. Also the last leaf under the peduncle is much narrower and longer. The difference of the breadth in old and young plants which is accompanied by diffence in breadth and acumination of the base is very important especially in the *Paracurcuma*-species and leads to dimorphism. I have made use of this average proportion in the description of the species, and indicated it by P. (Proportion). Some species can be determined by this.

5. Pubescence.

Pubescent leaves as occur in some asiatic species: *C. aromatica*, *C. latifolia*, *C. cordifolia* have not yet been found in Javan plants. But in most of the species the sheath is very finely pubescent or puberulous while the petiole and midrib are glabrous. Only in *C. sumatrana* Miq. the pubescence continues along the back of the petiole and base of the midrib. Practically the blade is glabrous except the filiform caudate point which is always more or less ciliate as are also the edges of the leaf top. When however the upper surface of the blade is scrutinized with a very keen lens, magnifying 12 — 16 ×, linear, there are always visible very short hairs dipersed on the parenchym in the foremorst part of the leaf sometimes very scarce, sometimes, as in *C. aurantiaca*, tolerably numerous and appressed to the parenchym, forming rows alongside of the veins.

6. Colour. The colour of the leaves is a good character to many species. We get with the aid of the leaves the following survey:

A. Leaves of both young and adult plants quite green without colour on the nerves:
  a. Peduncle central.
    a¹. Leaves rounded at the base. Ligula with an auricle on both sides of the base of the petiole (*Paracurcuma*), stem short;
      a². Auricle 5 — 10 m.m. long; leaves very dark-green, spreading, short-petioled. Bracts very pale-pink and light-green: *C. aurantiaca.*
      b². Auricles 2 — 3 mm. long. Flowering plant to $^1/_2$ meter high. Bracts all red purple: *C. petiolata.*
    b¹. Leaves always acute at the base: auricles of the ligula not laterally produced. Stem always more than $^1/_2$ m. high: (*Eucurcuma*)
      a². Bracts of the coma snow-white.
        a³. Leaves narrow, not very large, light-green. *C. domestica.*
        b³. Leaves large, broad, dark-geen (304 cod.) *C. viridiflora.*
      b². Bracts of the coma pink; sheath and ligula pubescent; leaves broad (P = 2.5), light-green: *C. soloensis*
        C. Brog.
        C. ochrorhiza.
  b. Peduncle lateral.
    a¹. Leaves with a very long-acuminate base, relatively narrow (P = 3 or more), ligula and sheath-edge ciliate: *C. Mangga.*
    b¹. Leaves with a rather broad acute base, rather broad and firm (P = 2.5); ligula nearly smooth: *C. Heyneana.*
    c¹. Leaves very large and thick pale seagreen at the backside: *C. Lörzingii.*

B. Leaves with a red or purple cloud at least in the young plant:
  a. Peduncle central:
    a¹. Hollow of the mid-rib brown-coloured exclusively on the upper side, colour not extending over the parenchyma. Leaves of the coma purple or pink. Brown colour of the younger leaves in old plants mostly vanishing. Flowers white or yellow: *C. colorata, C. euchroma.*
    b¹. Hollow of the mid-rib red-brown, colour passing about a little into the parenchyma so as to form a narrow feathershaped cloud on both sides. Flowers white with a yellow central bar of the lip: *C. purpurascens.*
  b. Peduncle lateral:
    a¹. Brown stripe on and along the costa sometimes very dark. in young plants; totally vanishing in old plants: *C. Mangga*, var. *rubrinervis* and *sylvestris*.
    b¹. Brown band and cloud persistent, vanishing only in abnormal circumstances.

a^2. Costa purple-brown over the whole length unto the petiole, or greenish in the middle with a broad (totally 15 — 25 mm.) purplebrown feather-shaped cloud on the parenchyma on both sides of the costa wich is visible on the dorsal side. The first appearing leaves often green. Rhizome light-yellow. *C. zedoaria.*

b^2. Costa more or less green at the middle, and only brown at the edge and outer-side.

  a^3. Leaves with a broad, dark-brown, rarely pale-brown spot at and above the middle, almost quite green below the middle: *C. aeruginosa.*

  b^3. Leaves with a narrow, dark- or pale-brown spot along the whole costa, broadest above the middle.

    a^4. Very high large plant with the leaves 1 m. long. Stem green. *C. xanthorhiza.*

    b^4. Stem dark-brown. *C. phaeocaulis.*

The above mentioned differences in colour proved to me to be constant in the different species. They, however often fade about the end of the growing period or in less favourable growing-conditions, or quite vanish in very bad circumstances (transplantation or injury), in those plants where they otherwise are very characteristic.

II. Subterraneous organs.

1. Stem.

The subterraneous stem of a foliate or flowering plant generally consists of a fleshy tuber (primary tuber or bulb) with rhizomes issuing from it. The bulb is commonly conical, ovate or globose and when young enwrapped by the scaly bases of the leaves, when old covered with the annular concentric scars of these. The annulated bulbs are not yet described in textbooks of botanical morphology, but they come nearest to the "solid bulbs" of *Crocus* and *Colchicum*, only they are coated merely as long as the aerial leaves exist and afterwards become nude and annulated. Sometimes they are annulated only at the top existing for the rest of the thickened topend of a rootstock and may then be compared with the tuberiform rootstock of *Trillium spec.*; and they always remain for some time in connection with the rootstock from which they have issued. From the buds of these bulbs the fleshy rootstocks spring mostly in opposite rows of 2 or 3, one above an other, they are composed of short internodes covered with appressed white membranous nerved trigonous scales, somewhat longer than the internodes, getting scarious and obliterating on old rhizomes. The rhizomes grow horizontally, obliquely or even vertically according to their place of origin. They may reach a considerable length (unto 300 mm.) or remain short, composed of but a small number of internodes; but always they have a tendency to curve upward and produce a new plant. Their buds are always disposed in two alternate rows and virtually every one of them has the tendency to produce either a rhizome branch or a new plant. The secondary and tertiary rhizome branches which spring practically from every bud, if covered with soil, are different in length. A few of them are equal to the primary branches and continue these after the endbud has developed into an aerial stem, forming sympodia and side-branches but the most part suspend their growth for some time and form rows of tubers either on each side of the principal secundary branch or, and this is more commonly the case, on the lower side only. These abbreviated rhizome branches are called "sessile tubers" by most authors and a complex formed by a rhizome-member with the adhering branches is commonly called a palmate tuber, though the disposition of the members is not at all what is called "palmate" in the botanical terminology, but rather "pinnate." Rumph was the first to describe the branching of a rhizome complex and compared the branches with their side-branches to a closed first. The latter he called „toes" (traduced by Burmann into articulationes or digiti). The primary bulb he called mother-root.

The habit of the bulb and rhizome-complex are very characteristic for any species and a most valuable help for the determination. Of no less importance for this aim are the internal colour, the smell and the taste.

The following colours where observed in different rhizomes. The ciphers are taken from the "Code des couleurs" by Klincksick and Valette (1908): (see above page 4).

Orange-yellow to orange (151—126) *C. domestica.*
C. xanthorhiza.
Orange-yellow to pure yellow (156—161) *C. purpurascens* and allied species.
Pale-sulfureus (241—246) *C. Zedoaria*
(206—216) *C. Brog.*
(226—236) *C. Heyneana.*
(236—241) *C. Mangga.*
Pale ambercoloured (153 D) = *C. Zedoaria* old rhizome.
Greenish blue 386 = *C. aeruginosa.*
Pale greenish blue 396 = „ and *C. phaeocaulis.*
light-blue 442 = *C. aeruginosa.*

Key to the determination of the principal species by their subterraneous organs.

A. Rhizomes very short or wanting; bulbs in groups together:

a Short rhizomes consisting of few limbs, bent upward, and forming new plants, with short broad branches, forked at the top, the whole forming a short and compact rhizome-system. Internally very pale sulfurcous: *C. petiolata.*

b. Rhizomes immediately upward bent and forming new plants; no branches: *C. aurantiaca.*

B. Rhizomes branching (*Eucurcuma*.)

a. Rhizome-complex consisting of middle sized falcate, upcurved members, merithallia, long 50 — 100 mm., horizontal and growing obliquely downward forming a new plant at their top and on the lower side (very rarely on both sides) a series of secondary and tertiary branches which are at first ovate, afterwards clavate and falcate, when young internally and externally yellow to orange-coloured (176—156), covered with snow-white, nerved, membranous scales, afterwards dark-grey externally; dirty-orange coloured internally:

a¹. Internally orange-coloured; pendulous tubers with a yellow inner cortex rarely quite orange: *C. purpurascens.*
C. viridiflora.
C. colorata.
C. soloensis.
C. euchroma.

b¹. Internally lemon-yellow: *C. brog.*

These species are difficult to distinguish by an exact description of the rhizome complex. They all are called "tis" or "tingang" on the sundanese market. All belong to the central-flowering-species. They are however, not seldom confounded with the lateralflowering *C. xanthorhiza.*

b. Rhizome-complex otherwise.

a¹. Rhizome-complex much branched, primary rhizome and rhizome-branches straight, mostly longcontinuous in horizontal or oblique or vertical direction forming often on both sides, rectangularly patent secondary and tertiary branches; terminal buds acute.

a². Rhizomes slender and very copiously and repeatedly branched; rectangularly extant branches biseriate, all parts internally and externally red-orange-yellow to miniate (151, 156, 161). *C. domestica.*

b². Rhizomes internally light- or dark-citrine.

a³. Rhizomes long, straight, or downward bent, mostly growing downwards and more or less clavate, with rectangularly extant branches never upcurved except when forming new plants, externally white, (when old light-brown), internally yellow (226 236, 231.) *C. Heyneana.*

b³. Rhizomes mostly consisting of shorter members mostly upcurved with very numerous snow-white short clavate branches, rarely pinnate, mostly in one series on the inferior side of the branches; internally (when young) light-citrine 236, 241, with white bark. *C. Mangga.*

c³. Rhizomes irregularly branched, colour internally light straw-yellow. *C. Mangga, var.*

b¹. Primary tubers large; rhizomes large and thick, mostly ventricose; terminal buds very blunt (lateral inflorescence).

  a². Tubers internally yellow.

    a³. Primary tubers 100 × 100, rhizomes an inch thick, with few branches, colour internally orange-yellow to miniate; pendulous tubers orange coloured on the section. *C. xanthorrhiza.*

    b³. Rhizomes thick in the middle, sometimes long, mostly short, with rectangularly spreading, more or less barrelshaped and clavate side-branches, in the middle thick with narrower base and top; tertiary branches tuberous. Section when young, very pale-yellow (231) when old light melleous-brown. Pendulous tubers very large, internally pale sulfureous. *C. Zedoaria.*

  b². Tubers internally blue, rhizomes and secondary branches sometimes long, ventricose, slightly upcurved or S-shaped, with rounded top, branches not numerous, pendulous tubers numerous at the rhizomes, internally pearl-grey.

    a³. Rhizomes internally light-blue or light-green (396 and 0296); stems green. *C. aeruginosa.*

    b³. Rhizomes internally often sallow-yellow or green, at the top and the buds more or less blue; stems darkbrown; *C. phaeocaulis.*

II. Roots.

The roots which spring in a very large quantity from the bulb and more isolated also from the rootstocks are filiform and very long. In young bulbs they often are thickened more or less near their base, even so as to appear almost napiform but tapering gradually and passing into ordinary fibre roots; roots of a diameter of 5 mm. were observed e. g. in a young bulb of *C. Heyneana* where they formed a dense group in the centre of the tuber amidst a large quantity of thinner fibre roots. Upon a tuber of *C. xanthorhiza* they reached a diameter of a little finger.

Rumph describes similar roots as belonging to one species in particular, called by him with the malayan or Javan term "tis" or "dingin" and he compares them with the clavate pendulous tubers of the "Kuntchi" *Gastrochilus panduratum.*

During the flowering period part of the fibrous roots form at their end filipendulous or pendulous tubers. These may be ovate or pearshaped, spindle-shaped or ellipsoidal and sometimes they pass again into fibrous roots at their end. Their lenghth may vary between 20 mm. and 150 mm. and their distance from the bulb from 10 mm. to 400 mm.

They are internally of a spongious or succulent or often viscous tissue and mostly of a watery-pale pearl-colour. But often they are quite yellow or orangecoloured internally and in other species pearl-grey with a citrine or a yellow inner cortex. Their shape and colour may be sometimes of use for determining certain species.

It seems that in Java nowhere the amylum of these tubers is used. In Hindostan several *Curcuma*-species are mentioned the root tubers of which are used for the production of flour ("tikoor").

III. Inflorescence and flower.

1. The inflorescence originates from the middle of the foliate stem or from a separate side-branch. In the latter case a new foliate stem springs from a side-tubercle of the flowerbearing tuber, together with or after the inflorescence.

In the subgenus *Paracurcuma* the inflorescence is central. In *Eucurcuma* this is only the case in a small group of species, *Mesantha*. In most species the foliate stem originates laterally from the base of the flowering-stem, *Exantha*. In the latter the flowering and foliate stem are enclosed at the base by a common short white scale and both are further surrounded by a number of closely appressed sheaths sometimes with more or less divergent tips, open on one side, they have a rounded or blunt top with a thorny point in the middle. On the flowering stems their number is varying from three to ten. There are differences in their form in several species, but also in several specimens of one species and especially in herbaria they are of little value for determination.

The peduncle enclosed by these sheaths is perfectly similar to the central peduncle of the *Mesantha*.

In both groups one or two, rarely 3 leaves are to be seen on the peduncle and these show almost the same variations in different species. In the most simple case they consist of more or less reduced blades without separate sheaths and without ligula. These may remain free unto their base or adhere with their edges to the stem, always leaving the back of the stem free so as to form spacious pouches placed at some distance under the inflorescence; this distance is varying from 10 mm. to 180 mm. In most cases one or two of these leaves take quite the form of flowering bracts; only they are empty, larger than the flower-bearing bracts and their shape is a broad triangle. Rarely, in the *Exantha*, those empty bracts are wanting and all the bracts of the lower part of the spike are floriferous.

As has been said before, there is in this form of the peduncle no difference between *Exantha* and *Mesantha*. In a separate inflorescence, destitute of sheaths, we cannot distinguish the *Exantha* from the *Mesantha* and, alas, such specimens are often found in the herbaria.

The spike is composed of bracts, whose number differs from 13 to 85. Usually the number is not constant for a species; so it may differ from 25 to 65 in *C. purpurascens*. In *C. petiolata* from 25—85. In *C. Zedoaria* there are no more than 20 bracts, as a rule; the bracts reach then a considerable size.

Theoretically the bracts are reduced leaves, partly adnate to the axis, and their phylogenetic origin is illustrated on an extremely clear way by the successive reductions from a normal leaf unto a bract which are to be observed in the peduncular leaves.

Generally their form is elliptic or obovate with an ovate top, and their lower portion from $^1/_4$ to $^4/_5$ is adnate to the higher placed bracts so as to form pouches while the free upper half forms by the upward bending of its sideparts a sort of wide channel or gutter which continues the pouch and the top of which is spreading or slightly recurved.

The lenght and breadth of the free portion of the bracts is the cause of a rather different habit in several species. In dried material it is often very difficult to state this difference.

Towards the top of the spike bracts and especially their free portions become longer and narrower; in the same time the green colour changes either into white or in some modicfcation of violet; generally a group of intermedial bracts is found between these two forms. The uppermost group forms the coma which has mostly a wider diameter than the rest of the spike and of which the last developed bracts produce only rudimentary or no flowerbuds.

The arrangement of the bracts is rather equal in all species and very regular. Nearly always may be observed 5 "parastichies" running in a rather steep curve which together contain all the bracts and of which the bracts are contiguous ("contact-parastichies"), and besides very often a system of 3 parastichies, running in a contrary direction and thus crossing the former ones and being likewise contiguous.

In the same species these 5-parastichies, „fünfer-Zeilen", (SCHWENDENER), "5-curves", (CHURCH), run now to the right, now to the left without preference, and the 3-parastichies (dreier-Zeilen) respectively the contrary. Tracing these 5 parastichies to their base one finds that their lowest bracts form together a depressed *spiral*, seemingly a circle or whorl like that which is seen very often in the disposition of the sepals of the dicotyledones and which is called "aestivatio quincuncialis"; of this spurious whorl the first and second leaf are placed outside, the fourth inside, the third and fifth half inside half outside. Following this spiral along the surface of the spike it may be seen that the 6th bract lies with the first in the same of the five parastichies above mentioned, the 7th with the second, the 10th with the 5th etc. This curve is the so called genetic spiral which contains all the bracts. According to the number of the bracts being larger or smaller the five first bracts (mostly including the 1—2 empty bracts) are placed in a flatter or in a steeper spiral. The 4th always is placed somewhat higher between the second and the first, the 5th between the third and the second, the 6th between the 4th and 3th etc. This curve naturally is no contact-line.

This arrangement of the bracts is what is called in a newer term (Church, v. Iterson, Schoute) the 3 + 5-position.

The 4th bract being inserted between the second and first, it indicates with the first bract one of the 3-curves (the other two are determined by the second and 5th and by the third and 6th bract) but in the same time it forms with the second the beginning of a 2-curve (zweier-Zeile) which, of course, runs opposite to the 3-curve and thus runs in the same direction with the 5-curve but forms a much lower spiral; the other 2-curve is determined by the first and third bract. Mostly these are also contact-parastichies; so that we have in most cases a (2 + 3 + 5)-position. Following then the genetic spiral it appears that also the 9th leaf forms with the 1st a parastichy, the 10th with the second etc. and also the 14th with the first; these are the 8 and 13-curves, of which there are of course resp. 8 and 13. Often the 14th bract is quite perpendicular above the first the 15th above the second so as to form orthostichous lines. So we have substantially a divergency of 5/8, but the line is very seldom really an orthostichous one but is more or less curved. In very dense spikes the 21-curves and sometimes the 34-curves are easily to be seen and thus both nearly perpendicular lines.

A general scheme of a leaf-positon of the divergency 13/21 (3 + 5-position with a rectangular parastichous angle) stretched out on a flat plane is to be found in Schwendener's Mechanische Blattstellungs-theorie (1878 fig. 1.) copied in Schneider's Handwörterbuch (1905, 93) and the leaf-position in a spike of *Curcuma brog* agreed perfectly with this; also in *C. purpurascens* this occurs sometimes in spikes of 40—50 bracts. Our Pl. IV fig. 1 of the young spike of a middle-sized *C. purpurascens*, is almost built according to this scheme. Taking here an indifferent bract we see that it is surrounded by 8 other leaves and thus the centre of 4 parastichies. So No. 9 is the point of contact of the 5-curve: 4, 9, 14, which takes to the left — of the three-curve: 6, 9, 12, which takes to the right, and is most conspicuous, of the two-curve: 7, 9, 11, which does not form a complete contact and of the 8-curve (1, 9, 17) which does not form a contact at all. When we think these figures placed on the "Dachstuhl" of Schwendener (l. c. 13) and we move these figures in such a way that the first and 9th separate a little farther, then the 7th and 11th will approach the 9th and the two-curve will become a contact parastichy. Then we get the 2 + 3 + 5-system usually occurring in the *mesantha*- or *purpurascens*-group. When we continue this stretching still farther, then the 4th, 9th and 14th also separate and the five-curve is no more a contact-line, and we have the system 2 + 3. This occurs often in very feeble spikes of the *C. aurantiaca*. It is thus the form of the parastichous angle, which determines the shape of the spikes, and this depends again on the number of the bracts, and the thickness of the axis. Of course such movings in- and outwards do not happen in natura.

The most frequently occurring systems are: 2 + 3, 3 + 5, 2 + 3 + 5, and 5 + 8. The first occurs in very feeble spikes of different species. It is the regularly found leaf-position in *C. Zedoaria* and *C. aeruginosa*, where the number of bracts is small (from 13 to 28), the axis rather slender and the bracts with their long pouches are far apart. Here the three first bracts form a spurious whorl, the 4th, 5th and 6th, the 7th to the 9th also, in such a way that the 4th comes between the second and the first; the 7th between the 4th and the 5th, etc.

The second case occurs often in the thick dense spikes of *C. purpurascens* of 30 — 65 bracts, however less often than the third; but it is not sure whether in reality there is still a contact in the twocurve, only the full-grown pouches having been observed by me. The 9th bract lies rather exactly above the 1st, the 8th and 13th spiral are very distinctly visible; the parastichous angle of the 3rd and 5th curves however, is very blunt.

The last case, where the lowest spurious whorl consists of 8 leaves, which form 8 distinct contact parastichies, occurs in the very regular spike of more than 80 bracts of *C. petiolata*.

2. Flower: The flower consists of the following parts:

1st: The calyx, which is about half as long as the tube of the corolla, thin-membranous, tubular, connected very firmly at its base with the corolla-tube and more or less dilated upwards. The upper margin is divided into three unequal, very short teeth and dorsally cleft nearly half-way down. The two largest teeth have a hairy small somewhat protruding crest or are truncate, or rounded; the smallest toothlet is blunt and connected almost entirely with one of the others. In the two Java species of *Paracurcuma* they are much larger than in *Eucurcuma*, very unequal and rounded. Moreover the whole calyx is there hirsute; so that only by the calyx these two species are readily recognised.

In the subgenus *Eucurcuma*, however, I have found the calyx of little value for determination of the species. In *C. euchroma* and in *C. Zedoaria*, for instance, I found specimens differing conspicuously in having the calyxteeth now broader now narrower, shorter or longer, acute or blunt.

2d: The *corolla*, united with the staminal-apparatus congenitally over its whole lenght. It has about the shape of a stalked cup (the tube with the faux) on the margin of which (using the common expression) *the three petals are inserted* and which continues inside of these into the lip at the front and into the stamen with the staminodes at the back.

The petals are of an other, somewhat more membranous consistency than the rest, they are confluent with the outer layers of the tube-tissue, so they may be pulled off leaving the other parts seemingly undamaged. Their colour is pellucid-white *(C. purpurascens)*, pale-pink (*C. viridiflora*) pink *(C. xanthorrhiza)* red-purple (*C. aeruginosa* and *C. phaeocaulis.)* The dorsal one is cucullate and ends in a hollow hairy point, rarely (as in *C. aurantiaca)*, the flower is externally more or less hairy.

The labellum (see Pl. II fig. 3 and 11) an obovate or orbicular disc consisting of a straight somewhat thickened middle bar ending in the dilated and bifid endlobe which is more or less protruding and often decurved and of the semi orbicular sidelobes upcurved so as to form a wide channel.

The outline of the lip is generally quite entire but if it is flattened artificially there appears a fanshaped wrinkle on each side of the top, as a consequence of the upcurling of the sideparts; sometimes however there is an emargination on each side of the top or median lobe separating it from the sidelobes. In *C. aurantiaca* this midlobe is much broader than in the other species and of a semi-orbicular ontline. Here it stands straight out in the living plant, instead of being curved down as in most species. In *C. petiolata* it is also rather broad and has a triangular outline but it is decurved in the living flower. The sidelobes are (when flattened) semiorbicular; downwards they form another flabelliform wrinkle on either side whereby they are separated from the lower part, which appears as a broad and very short stalk or claw. The mid-lobe has in the flattened lip a bifid tip of which the lobules sometimes are overlapping, and is traversed in the middle from top to bottom by a longitudinally veined band of a firmer structure and an orange-yellow or yellow colour (156-176), in all the species known to me, while the lip for the rest is pale-orange, white or cream-coloured. The mid-band is narrower than the mid-lobe and is traversed by a number of straight vaseular bundles of which mostly 6 are more conspicuous with an odd one between them which is divided about the middle of the lip into two or more slender branchlets, which spread at the top in the end-lobe. Downwards these fascicles bend outwards forming the lower limit of the sidelobes and continue to the base of the throat. On both sides the central bar is limited by a broad border of papillae, and in very young buds of *C. xanthorhiza* there is to be seen an elevated line, on either side, which reminds of the wings observed by GAGNEPAIN in *C. alismatifolia.* The sidelobes are traversed to the edge by a greater number of outward curved lines.

The labellum represents in the flower-diagram a combination of the two foremost stamina of the interior whorl, (of which only one, the back-stamen, persists as such) with one stamen of the outer whorl of which the two staminodes represent very clearly the two dorsal ones.

For the rest there are still 3 suppositions possible:

A. The inner or petalar staminodes are abortive and the labellum in its entirety represents the whole outer staminode (K. SCHUMANN).

B. The middle-part of the labellum represents the outer staminode, the side-lobes represent the two inner- or petalar staminodes.

C. The labellum consists of two lateral innerstaminodes, while the odd outer staminode is abortive (LESTIBOUDOIS and many others).

COSTERUS has recently (1915) defended the supposition B. and has given it a new support by the examination of the course of vascular fascicles. According to him it is the central fascicle of the labellum that represents the abortive outer-staminode.

In the bud the margins of the lip as well as the top are more or less crisped and involute, forming a hood and clasping the upperpart of the stamen in all species. This is observed by GAGNEPAIN in *C. longa* (1908, 63). The lip itself is quite enclosed by the staminodes with exception of the middle part of its back, and together with the stamen and lateral petals all are enwrapped for the greater part by the dorsal petal, which leaves only free the base of the latter ones.

The aestivation agrees here perfectly with the fig. of EICHLER, quoted by SCHUMANN (1904) p. 15. fig. 4, if the asterisk be substituted by the middle-part of the labellum. According to this empiric diagram we should come to the conclusion that both the staminal-cycli are represented in *Curcuma* (supposition B.) The structure of the lip however which shows no clear indication of not consisting of one entire piece, but, regarding the venation, quite agrees with a staminode does not give a certain decision in favour of one of the three suppositions, given above.

The corolla-tube and the faux are connected by a narrow slit and separated by three hairy tufts, placed on a more or less thickened ring and barring the access to the nectaria to unwished for visitors. The bottom of the faux is also more or less hairy. The relative lenght and breadth of the faux and tube cause differences in the shape of the flowers in different species, but these are comparatively little and in most cases not to be seen in dried material.

Above and in face of the insertion of the dorsal petal the tissue of the faux continues in the stamen with the two staminodes (see Pl. II) which are connate with it at the base as far as 2 or 3 mm.

For the diagnosis of the species the shape of the staminodes is not without importance. In *Eucurcuma* they are two elliptical-oblong or nearly round petaloid disks, more or less convex at the inner edge, which is contiguous with the stamen, and convex at the outer edge, thus bending on both sides over the anther; their longitudinally folded and wrinkled tip is crammed in and fastened by the hood of the dorsal petal (see fig. 1 and 3).

In the Javan species of *Paracurcuma* the staminodes are not folded up. They are flat and the shallow hood of the dorsal petal presses slightly against their back; their margins are overlapping behind the stamen. Here they are velvety; in *Eucurcuma* always glabrous with a papillose area in the middle only. The stamen consists in both subgenera of the short broad filament which is narrowed upwards and passes on the back of the anther into the narrower fleshy connective; in *Eucurcuma* about in the middle, in *Paracurcuma* near the base of the anther.

The anther consists of the fleshy broad connective, ovate when seen from the back, horse-shoe shaped on the section, and including the style, each arm bearing a flat linear theca. Below the place of affixion to the filament the back-wall is prolonged on either side- to an awlshaped spur with a thickened base, while the outer wall ends downward in a small projecting tubercle. The top of the ovate or oblong dorsal portion of the connective is sometimes quite blunt, sometimes it is prolonged into a small lingula projecting between the two anther cells. This is mostly yellow and of a glandulous tissue. The apex of the style with the stigma passing between the two anthercells is in the bud enclosed between these and the lingula, but in the open flower it passes beyond it and is protected by the hood of the petal only.

In C. *aurantiaca* the shape of the anther is somewhat different. Here the connective is also horse-shoe-shaped but the connecting portion on the back is not ovate but linear and nearly as long as the thecae, the point of affixion to the connective being near the base; upwards it continues behind the top of the thecae and forms above these a small room, just large enough to be filled out by the stigma. There are no spurs at the base but the anther is here obliquely truncate and the thecae continue on the lower margin of it, bending backward with a right angle; the tubercle of the wall is wanting. The anther is curved in the shape of a shallow C, concave on the face. Compare Pl. II fig. 28.

In the shape of the stamen, as well as in nearly all other traits, C. *petiolata* is intermediate between C. *aurantiaca* and the *Eucurcuma*-species. Here the affixion of the anther is near the base, as in C. *aurantiaca*, but there are short curved spurs; and the thecae continue with right angles on the lower margin of the anther, and over the foremost surface of the spurs. The tubercle of the anter wall is present. The prolongation at the top of the connective is much smaller than in the former and approaches in shape the lingula of *Eucurcuma*, and the stigma is somewhat projected beyond it.

The shape of the anther and of the spur is rather constant in each species. Differences exist in the pubescence, in the lenght and width of the thecae and of the lingula, the length of the dorsal part of the connective and especially in the form and divergence of the spurs. Most of these are of any use only in fresh material, e.g. the pubescence which is only conspicuous in open flowers and the form of the spurs, which become difformed in drying up. Only more considerable differences in the shape of the thecae and of the appendage of the connective, can be recognized in herbarium materials. But here only ripe buds are to be used, for in the decaying flower the stamens thicken in their central part and contract in a corkscrew fashion while dying and so the anther gets difformed. Again if the buds examined be too young the proportions of the anther are abnormal. So e.g. the anther described by GAGNEPAIN in *C. longa* (1908, 63) = *C. domestica*, Val. showed the connective almost quite loosened from the thecae which were attached to the filament near their top. This is quite contrary to what is seen in living flowers of that species.

3e Pistillum. The ovary is hairy in all species of *Curcuma* known to me (according to SCHUMANN this is not the case in *C. leucorhiza*, Roxb.) and so is the base of the calyx too. The ovules are apparently always well-developed; on the top of the ovary are to be found the two cylindrical nectaries or "stylodes", varying in lenght between 4—8 mm. and secreting a large quantity of nectar, which remains stored up in the corolla-tube.

In ancient descriptions (HOOKER, BENTLEY and TRIMEN) these are often erroneously called staminodia.

The style is filiform, glabrous, runs along the back of the faux and filament, passes between the thecae and terminates in the stigma. This is a cup-shaped two-lipped organ with a broad transversal chink, the ciliated lower lip of which is somewhat protruded.

For the description of fruit and seed compare *C. aurantiaca.*

Fertilization.

The flower of *Curcuma*, as well of *Eucurcuma* as of *Paracurcuma*, is quite fitted for pollination by insects, as also is known from the other *Zingiberaceae*, and especially for cross-fertilization. In one species *(C. soloensis)* the loculi of the anthers contain no, or a very little quantity of, pollen connected by a narrow strip of tissue and these are for the rest filled with mucilage. Nevertheless I once found pollen on the stigma of a flower of this species. It must have been brought from the flower of an allied species, of which many specimens grew in the neighbourhood. In our cultivated species however the pollination happened very rarely; they flowered in the middle of the rainy season and insect visits were very rare.

Only once during the many months in which I observed the flowers I saw a green bee (probably an *Anthophora*) enter into two flowers of *C. euchroma*, and a Xylocopa visiting flowers of *C. aurantiaca*. Where pollination occurs an abundant crossing may be expected between related species for the form and construction of the flower is nearly equal in many species of *Eucurcuma*. I believe, however, that fertilization is also very rare in wild growing plants, e.g. in the very common and abundantly flowering *C. purpurascens*, wild growing species belonging to the *Mesantha*. For fruits never were found in any of the spikes of central flowering species collected in the teak forests. Only two species: *Curcuma Mangga*, var. *sylvestris* (an Exanthous species) and *Curcuma aurantiaca* v. Zyp (a *Paracurcuma*) I received abundantly fructiferous spikes, the latter from different regious of Java. I also found twice a single fruit in one of the numerous examined spikes in our cultures of this species.

The pollinating-apparatus of an *Eucurcuma* has been rather correctly described by H. O. FORBES (1885, 247), with a good figure.

This is composed in the following way: (see our fig. 8 on Pl. II).

As is described above each anther-cell is provided at its outer wall with a right or curved spur of the lenght of $^1/_4$—$^1/_2$ of the whole anther, the fleshy base of which forms the back wall of the cell. Besides the lower margin of each cell bears a small tubercle at its base at the outer side.

Just above the spur-base the anther is attached with its thick connective to the narrowed top of the short filament which is traversed by three elastic fibre-bundles passing into the connective; these allow the anther to rotate on its point of attachment.

In the quite opened flower the anther lies transversely on the filament, face upward, and in such a way that the spurs are placed precisely in the middle of the orifice of the corolla, while the upperpart of the anther with the apex of the style (passing in the common way between both thecae, so that the stigma protudes a little above the anther) is hidden in a firm "dome" formed by the folded staminodes of which the posterior half is clasped by the hooded dorsal petal. No insect of a mediocre size can intrude into the flower nor reach the stigma and anther without bumping its head against the spurs and then immedialy afterwards its back against the lateral tubercles of the thecae. A middle-sized bee doing so moves the lever and the entire face of the anther with the stigma are pressed firmly against the back of the insect. The cells being very shallow the coherent pollen forms a flat strap covered with a thin layer of mucilage. As soon as the bee, which has entered deeply into the flower, withdraws, the anther returns in its transversal position; the stigma first separates from the body of the bee and then the loculi gradually from the top to the bottom but then the top of the pollen-mass sticks tot the back of the insect, and the loculi leave their contents in a coherent strip on the back of the insect. It is clear that so the stigma does not touch the pollen and at all events the pollen touches only the outer side of the lower-lip.

The bee entering into an other flower rubs along the lower lip of the stigma and the pollen is forced into it. The construction is thus practically perfect to make sure crossfertilization.

In *C. aurantiaca* the construction is similar, but very different in particulars.

The side-walls do not end in a protruded knot; the anther is attached near the base to the filament and is erect in the normal position, but it is a little curved, concave at the face. The entrance to the flower tube is thus free but the body of the insect which moves along the somewhat angular projecting base of the anther, presses the top with the stigma against its back. Here the thecae are reflexed and in the angle-point the mucilaginous wall forms a viscouscorpuscle in function similar to the retinaculum of the Orchids.

The back of the insect entering into the flower touches this most projecting point of the anther. When the insect comes out again it pulls the short lever arm up and the upper part of the anther constituting the longer arm removes gradually from its back; but with this the whole pollen mass (see Pl. III f. 29) gets loose from the thecae as a coherent strip from below to above, and remains erect on the back of the insect. The (see fig.) whole process is thus just the contrary as in *Eucurcuma.* While in the latter the retiring of the anther is mechanic, and the insect looses the pollen strip from *above* to *below;* in *C. aurantiaca* the anther is pulled backward by the retiring of the insect itself and and in the same time the pollen is loosed from *below* to *above.*

As in so many respects *C. petiolata* is here again intermediate between *Eucurcuma* and *C. aurantiaca,* but nearer to the latter. As in *C. aurantiaca* the anther is attached near its base and is nearly erect, the short spurs are of little use to block the entrance. Besides, as has been said, the loculi are recurved at the base, as in *C. aurantiaca,* and continue over the lower edge which is at the same time base of the spur.

Evidently the construction is nearer to that of *C. aurantiaca* and the pollen gets loose also from below to above. The lower part of the thecae, however, though polliniferous is very narrow, and may easily be overlooked.

A similar structure is also to be seen in *C. Heyneana,* V. et v. Z. (see below) where the little cap of the connective protrude a little farther and the spurs are less deeply grooved. A beginning of a continuation of the thecae in the spurs is also found in *C. aeruginosa* but here it does not contain pollen. In the latter species, however, the pollination is just as in *Eucurcuma.* I never saw living flowers of *C. Heyneana* and cannot tell how the pollination takes place.

§ 5. **Key to the determination of the species.**

I. Tubers in groups, without elongated rhizomes. Leaves rounded at the base. Anthers not or shortly calcarate. Staminodes not folded. Ligulalobes auriculate.

A. Anthers ecalcarate: *C. aurantiaca.*

B. Anthers shortly calcarate; loculi of the anthers continnous over the base of the spur.

a. flowers orange; bracts of the coma quite dark-purple-brown, floral-bracts also dark-purple-brown at the top: *C. petiolata.*

b. flowers light-yellow; bracts of the coma pink.

a¹. spurs of the anthers curved, floral-bracts obtuse: *C. australasiaca.*

b¹. spurs of the anthers straight, cells continuous along the whole face of the spurs.

a^2. Bracts acutely apiculate; lip and staminodia long and narrow: *C. meraukensis.*

b^2. Lip and staminodia very broad.
Flower nearly as long as broad when explained: *C. latiflora.*

C. Flower unknown. Habit of *C. petiolata:* *C. sumatrana.*

II. Rhizomes elongated, branched. Leaves narrowed at the base. Flowers white or pale-yellow or pale-orange. Anthers with solid spurs, which are nearly as long or half as long as the cells, with a fleshy base at the back wall of the cells and with a knot on the foremost top of the cells. Staminodia folded longitudinally. Ligula-lobes not auriculate.

A. Inflorescence central — *Mesantha*:

a. Bracts all lanceolate, the outmost somewhat broader; more than half free, all light-green or the bracts of the coma white, sometimes with minute brown spots near the top. Bracteoles 30-35 mm, long, corolla-tube very long. Lig. proportionally small. Flowers white: *C domestica.*

b. Floral-bracts, when loosed from the axis, obovate or elliptical, adnate to the half or more.

a^1. Bracts of the coma white or light-green.

a^2. Flowers slender, protruded ten to twenty mm. beyond the bract; top of the lip curved outwards. Flowers white with a yellow middle-band of the lip. Bracts of the coma white at the base, often brown-spotted and light-green striped at the top.
Costa of the leaf brown above: *C. purpurascens.*

b^2. Flowers short and broad, not protruded beyond the bract; middle-part of the lip not protruded.
Flower cream-white. Petals light-pink middle-band of the lip dark-yellow. Costa of the leaf not brown; leaf darkgreen: *C. viridiflora.*

b^1. Bracts of the coma pink or dark-purple.

a^2. Bracts of the coma dark-purple, floral-bracts purple at the top. Floral-bracts very broad; some of the lower ones adnate more than half way, all broad-ovate, very obtuse, somewhat narrowed at the top. Flowers protruded ten mm. or more beyond the bracts, orange yellow with pink petals. Costa of the leaf brown above, rhizome orange-coloured: *C. colorata.*

b^2. Bracts of the coma light-pink or violet, lower part white; floral-bracts mostly quite green; not adnate beyond the middle.

a^3. Mid-rib quite brown-coloured above, at least in the oldest leaves, parenchyma green. Flowers slender; staminodia blunt-elliptical, rhizome brightorange-yellow: *C. euchroma.*

b^3. Leaves without a brown mid-rib.

a^4. Rhizome citrine; Flowers light-yellow: *C. brog.* p. 18

b^4. Rhizome orange-yellow: *C. soloensis.* p. 46

c^4. Rhizome whitish: *C. ochrorhiza.* p. 15

B. Inflorescence lateral.

a. Leaves quite green:

a^1. Inflorescence with acute, elliptical or elliptical-lanceolate floral-bracts; with lanceolate white intermediate bracts and pink bracts of the coma. Flowers short and broad; lip and staminodia nearly orbicular; endlobe not protruding. Leaves commonly less than 3 times longer than broad: *C. Heyneana.* p. 51

b^1. Floral-bracts rounded, small, coma bracts violet, obtuse, without a mucro. Leaves more than 3 times longer than broad.
Flowers narrow, with a long and deflexed end-lobe of the lip: *C. Mangga.*

c^1. Floral bracts very broad rounded or subtruncate, free parts not longer or shorter than the pouches, all bracts without a mucro. Endlobe of the labellum broad not much protruded, Leaves pale seagreen at the backside: *C. Lörzingii.*

b. Leaves with a feather-shaped light- or dark-purple-brown cloud along the whole costa or a part of it.

a^1. Cloud at length vanishing and the full-grown leaf quite green.

a^2. Rhizome yellow and odoriferous: *C. Mangga* var. *rubrinervia.*

b^2. Rhizome nearly colourless, nearly scentless: *C. Mangga* var. *sylvestris.*

b^1. Leaves with a persistent purple-brown cloud along the costa.

a^2. Foliate stem dark-brown. Petals purple-brown-red, costa brown along the edges to near the base and in the upper half somewhat broader brown; rhizome partly blue, partly light-yellow or light-green: *C. phaeocaulis.*

b^2. Foliate stem green.

a^3. Leaves with a wide brown cloud on both sides of the costa, only in the upper-half of the leaf. Petals purple-brown-red. Tuber and rhizome internally blue and partly white, the young rhizome aeruginous: *C. aeruginosa.*

b^3. Leaves with a brown cloud along the costa, feathery spreading, often continuous to the petiole; costa itself mostly in its upper-part also brown-coloured, for the rest green; petals rather white; flower short, lip and staminodia short and broad, tuber internally light-yellow: *C. Zedoaria.* P 57

c^3. Leaves with a brown cloud along the sides of the costa, which itself is green, petals pink, rhizome and root-tubers internally deep-orange: *C. xanthorhiza.*

§ 6. Description of the species.

Curcuma domestica Val. nom. nov. *) *C. longa* **(non. Linn.) Koen. (1783, 3, 72); prob. Gagnepain (1908, 63); prob. Loureiro (1790, 10).** *Curcuma domestica minor* **Rumph. (1746 V. 169 t. 67!)**

Herba mediocris vix metralis, raro sesquimetralis. Bulbus ellipsoideus. Rhizomata numerosa, e toto circuitu bulbi densissime exorta, cylindrica vel medio incrassata, stricta, superiora horizontalia, ramis secundariis et tertiariis etc. numerosissimis et iterum iterumque ramosis, vulgo biseriatim supra et subtus e ramo prioris ordinis exortis et angulo subrecto patentibus. Omnes partes extus et intus intense aurantiacae vel imo miniatae. Sapore et odore valde aromatico, radices Daucus carotae referente.

Radices filiformes et filipendulae saepe longissimae, tuberi fusiformes intus albi, cortice interno flavescente.

Folia inter minora, saepe pedalia, raro in speciminibus uberosis usque semimetralia, oblongo-lanceolata, medio 3.5 × longiora quam lata, basi in foliis primariis obtusiuscula, in junioribus decurrenti-acutata, tenuia, glaberrima, tota viridia patula longe petiolata et vaginata.

Ligulae lobi angusti, ciliati, leviter arcuati, intus arcu basi convexo contigui, extus cum margine vaginae membranaceo valde prominonte confluentes et leviter auriculatim exserti.

Inflorescentia centralis scapo brevi, saepe vaginis foliorum superata. Bracteae, pleraeque lanceolato-ellipticae acutae, superioribus ad $^{1}/_{3}$ vel $^{2}/_{5}$ vel fere ad medium usque laxe adnatae, suberectae apice paullum recurvo-patulae et canaliformes, inferiores ovatae acutae, infimae 2—3 steriles, ceteris paullo majores. Comae bracteae ceteris paullum longiores et brevius adnatae, tenerae puberulae flaccidae, ± 4 apicales minores steriles.

Bracteae florales basi et medio virides marginibus et apice albae, comae pro maxime parto vel totae albae summo apice vulgo parce dilute badio-punctulatae.

Flores inter majores, albi, labello cremeo, parte mediana lutea.

Bracteolae permagnae, tubum corollae valde superantes.

Calyx late tubulosus. Corollae tubus longissimus sensim in faucem infundibularem dilatatus; labellum suborbiculare lobis lateralibus parvis lobo mediano sat prominente, emarginato. Staminodia obovato-linearia subfalcata rotundata basi sat alte filamento adnata. Filamenta duplo longiora quam lata. Anthera distincte ligulata, calcaria patentia late cornuformia summo apice *semper extrorsum recurva.*

The mean size of the bulb is 50 × 25, and it consists of about 12 circles. The rhizomes which proceed all around the old bulb are 50—80

---

*) GAGNEPAIN (1908, 63) and SCHUMANN (1904, 108) quote, as a synonym of *Curcuma longa, C. domestica,* Lour. This synonym, however, does not exist.

mm. long, as thick as a man's finger, straight, or a little curved, and produce at both sides, often at almost right angles, the secondary and tertiary branches, which spread freely forming a dense clump. The ultimate ramifications ("sessile tubers") are very numerous, and form two opposite rows standing out at right angles; they are elliptic, acute, about an inch long.

RUMPHIUS describes such a clump in this way: "The whole clump seems to be composed of many half closed fists and childs hands, some of which are placed in the earth obliquely, others transversally, consisting of rather long articulations with few fibrils and glands, the latter existing only in old stocks. So the whole stock, dug out and depurated from its skins and fibrils and quite smooth, resembles a fine artificially and elegantly cut out handiwork."

The rootstocks are externally and internally orange to miniate, the young tips white (Cod. 126 — 160, the younger ones 136 — 131.).

Pendulous tubers hanging at the top of very long (often 400 mm) fibres are ellipsoid 40 × 20, internally of a watery grey colour with a yellow inner cortex, the fibres often swollen near the base (5 mm thick) and coloured like the tubers.

Leaves oblong lanceolate, base obtuse or almost rounded in the primary leaves, long attenuate in the younger ones; wholly green, long petioled. Petiole thin rather abruptly broadened to the sheath of which the broad membranous border is ciliate and somewhat puberous over a short distance, the sheath for the rest is smooth. The ligula consists of two semilunar diverging lobes, (1 mm broad) contiguous in the middle of the sheath, confluent at the outer side with its prominent border and forming a very short ciliate rounded auricle at each side of the petiole base.

The leaves are commonly rather small, in flowering plants rarely surpassing 500 mm. In one very large sterile form or variety from Modjokerto (vern. name = "Kunir bentis" jav.) they measured from 450 × 90 — 700 × 100 (= P 3-7.) the petioles 190-400. In the outer (first appearing leaves) they are elliptic (P = 2.5) but the mean size is 300 × 70-80 (P = 3.2—4.3, mean P = 3.5).

The inflorescence measures from 100-150 × 50-70, cylindrical. The peduncule varying much in length bears commonly a reduced leaf-disk.

There are often two or three vacuous bracts at the base of the spike, of which the outer one is often placed at some distance; the two innermost are almost alike to the flowering bracts but often shorter and wider (32 × 25). The bracts are all elliptic-lanceolate and acute, (mean length 50 × 25 — 27 to 60 × 24, those of the coma 60 — 75), all are adnate only for $^1/_3$ — $^2/_5$ rarely to $^1/_2$ of their length, forming short pouches from which the flowers in the middle of the spike are somewhat protruding, the free parts are spreading and a little incurved, of a rather thin consistence, all finely pubescent at both sides, especially near the top, which in the coma is conspicuously mucronate. The colour of the mean bracts is light green, often with white length stripes or white bordered, near the coma whiter, a few (often only 4) of the coma-bracts are wholly white, only with some very-fine scattered light brown spots near the top.

Flowers long and narrow. Bracteoles large (35 mm.). Smallest measured flower 48, tallest 56. Dimensions: K 10—12, C 48—52, T 18—24, F 15—16, Lab. 15—16 × 14—17. Lip almost orbicular with a very short claw. Stamd. falcate oblong, top rounded or almost truncate, with a deep furrow, 10 × 6; fil. rather long 5—6 × 3. Anthera with a broad ovate connective, the top of which is distinctly protruding between the cells, united with the filament about the middle of the cells. Spurs very large, broad, diverging, a little curved with the fine *top always recurved to the outside*. By the last character alone the flower is readily distinguished from all other species.

The tube is rather narrow, abruptly dilated into the broad (25—30 mm.) faux, the lower part of which is internally hirsute. The flower is creamy white, with the exception of the yellow band of the lip and the white petals.

Distribution: Java. Cultivated, and wild growing throughout Java. It grows everywhere in teak forests and the roots are gathered and sold in the market-places.

Native names: "*Koneng temen*", sund., "*Kunyit*", mal., "*Kunir*", Jav. A very large variety cult. in Modjokerto = "*Kunir bentis*".

Rumph gives still another malay name "*Kuning warangan*", never met with by us.

In Sumatra, Muara Dua at 150 M. cult., native name "*Kunyer*". Leg. Grashoff 482 (Herb. Heyne).

It occurs also in Malacca (only cultivated) where it is known by the same Malayan name as in Java "*Kunyit*". (Ridley 1897, 268). The living specimens kindly sent by Mr. Ridley leave no doubt about the identity. In the only rather poor inflorescence which has appeared, the coma-bracts were greenish white, without any trace of pink. According to Ridley this plant produces the "turmeric" of Malacca.

Probably the species occurs also in Cochinchina (Loureiro. l.c. "bracts whitisch, rhizome deep yellow") and the good description given by Gagnepain of *C. longa* agrees very well with our species.

Only there are a few remarks with relation to some details of his description, which has been made up from dried specimens.

1e. The tips of the coma bracts are said to be pink. If this is not a compliance to tradition, the species varies with pink topped coma bracts.

2e. "Bractées à peu près libres". The relatively short pouches are indeed a good character of this species. Still in the living spike, the bracts are always adnate to $^1/_3$ — $^1/_2$ of the length.

3e. "Anthère inséree presque par le sommet sur le filet, connectif presque nul". In the living flower the filament is affixed to the fleshy trigonous connective about the middle of the dorsal side of the cells (as in all other species of *Eucurcuma*).

4e. "Labelle capuchonné au sommet". This is indeed the case with all species of *Eucurcuma*, but only in the bud. In the open flowers the labellum has always a protruding bifid terminal lobe, which in this case is rather long and reflexed.

Curcuma purpurascens, Bl. (1827, 46). *Curcuma domestica major* Rumph. l. c., cum tab. 68 (sphalmate a Burmannio ad *C. zedoaria* reducta).

Bulbus conoideo-ovoideus magnus. Rhizomata numerosa crassa imprimis e basi bulbi excrescentia horizontalia et verticalia saepe clavata, semper leviter apicem versus curvata; rami secundarii et tertiarii pauci vel numerosi crassi breves plastici, e latere inferiore rhizomatis exorti, illique similes horizontales et sursum recurvati.

Omnes partes adultae intus intense sordide aurantiaco-luteae; novellae pallide luteae vel luteae. Rhizoma juvenile extus luteum squamis albis vestitum. Tuberi filipenduli magni ovoideo-vel oblongo-fusiformes fibris longis penduli intus pleromate griseo, cortice lato intense luteo. Radices incrassati stirpis juvenilis pleromate luteo, cortice griseo.

Caulis valde compressus cum foliis 6 vel pluribus erecto-patulis ad 1.5 M. altus, juvenilis squamis 3—4 appressis apice crasse spinulosis saepe rubescentibus involucratus. Folia magna, inferiora subsessilia, superiora sensim longius petiolata, petiolo late canaliculato, exteriora minora late elliptica, interiora sensim magis elongata, omnia basi lata obtusa, constricta et specie rotundata, in petiolum decurrentia, albomarginata, apice breviter acuminatissima, vulgo 2 — 2.5 — 4 × longiora quam lata, supra sub lente fortiore puberula et versus apicem ciliolata, subtus glaberrima, intense viridia, costa media supra per totam longitudinem sordide purpurea, in fol. exterioribus colore magis intense, in junioribus sensim pallidiore demum evanescente, parenchymate attingente imprimis in medio folii etiam colorato. Ligula angusta cum margine pubescente vaginarum ciliata, lobi semilunares.

Inflorescentia magna in apice caulis cum scapo $^1/_4$ — $^1/_2$ metralis, nunc vaginas foliorum superans, petiolis superata, nunc inter vaginas disjunctas semi-inclusa.

Folia peduncularia valde varia semper sessilia saepe unum foliaceum anguste lanceolatum pedale vel ultra, spicae appressum. Bracteae vacuae semper 1—3. Bracteae florales latissime ovatae vel subobovatae apice brevissime obtusissime attenuatae late rotundatae, bursis latissimis validis, partis liberis aequilongis; haec valde induplicatae, canalem versus apicem dilatatum, bursa angustiorem sistentes; in parte superiore spicae elongatae, late

ellipticae, acutae; bracteae comae numerosae, pleraeque fertiles elliptico-lanceolatae, bursis abbreviatis, summae lineari-lanceolatae, omnes acutae et brevissime mucronatae, paucae steriles breviores.

Bracteae pleraeque pallide virides, supra medium spicae pallidiores albido-striatae, versus apicem albae apice viridescente, dorso pallide purpureo-puncticulatae, omnes utrinque cum pedunculo dense puberulae.

Flores inter majores, valde angusti, semper parte $^1/_3$ vel $^1/_4$ supra bracteam emergentes, bracteolis tubum corollae superantibus involucrati. Calyx tubi dimidium superans, dorso breviter incisus brevissime late dentatus. Corollae tubus gracilis, fauce infundibulari versus ostium angustata, labellum obovatum in unguiculam brevem angustatum, lobo mediano semiorbiculari, bifido, sat prominente paullo deflexo. Staminodia obovato-oblonga apice rotundata; stylodia parva. Filamentum vix longius quam latum. Anthera elongata, calcaribus e basi lata apice valde acutis leviter curvatis, patulis, loculis vix brevioribus. Corolla cremea, petala alba, labellum medio luteum.

The conical primary tuber (70 × 30, 80 × 30), which flowered last monsoon produces now a number of rhick fleshy rhizomes (80 × 25 with 5 — 15 mm. long internodes), with 4 side-branches of which the lowest lengthens itself and forms a young primary tuber, whose offshoots again form a third primary tuber, the youngest tuber bears fleshy swollen roots. Root tubers elliptical on very long root fibres.

The rhizomes as well as their branches always are falcate, upward curved; the side branches always originate on the lower side of the primary braches.

The shoots are pale-yellow. The old rhizome is dirty-orange externally and internally (161 — 156). The old tuber (186), yellow-orange-yellow; the young white offshoots internally light-orange (196 — 191). A young rhizome 186. The root-tubers have a grey pleroma and an orange-yellow inner cortex. The fleshy roots have in the contrary an orange-yellow pleroma.

A flowering plant with about 7 leaves had a spurious stem $^1/_2$ M. long, 60 mm. broad at the base, 25 mm. thick. The petioles 60, 160, 270 on one side, 100, 210 on the other side. The leaves placed in two rows and pushed aside by the peduncle, measured on one side 550 × 220, 060 × 230, 700 × 190, on the other side 600 × 230, 630 × 215, of which the youngest was not quite grown. The young leaves are on the surface especially near the top, along the veins more or less densely covered with obliquely spreading hairs, which are visible by a 8 — 16 times magnifying power, and the narrow membranous (in vivo white) edge is ciliated especially at the top. Also the finely pointed acumen is ciliated.

The rather broad projecting edge of the sheath is over a great length finely and densely hairy. The broad ligula lobes are rather long ciliated.

The peduncle with the spike may attain a length of 500 mm. and it protrudes to the top of the leaf-sheaths; very often the stem remains short and the spike so as in *C. domestica* appears laterally between the sheaths. Usually there are two peduncular-leaves of which then the highest is bract-shaped and forms a part of the spike; while the lowest sometimes has a long abnormal narrow blade; sometimes the peduncular-leaf is wanting and then there are two sterile bracts at the base of the spike. The spike reaches a length of 100—220 (mostly 140) mm. The number of bracts is 30—67. The flower-bearing bracts are ovate-elliptical with a broad ovate upper-part, attenuate, but rounded at the top; the free parts are longer and broader than the pouches, but narrower than the latter by the inward bending of the side-parts, they are erect, their tops more or less patent. In the largest intermediate bracts the tops become acute and more decurved. The coma-leaves are elliptical-lanceolate to oblong and mucronate, and much spreading.

In a spike 200 mm. long and 100 mm. broad at the top, with about 35 bracts the middle size of the bracts is 43 × 35; the lowest sterile 44 × 30: (pouch 17) and one of the lowest 50 × 30 (pouch 20): the 16th from below. The largest coma-leaves of a large spike are 84 × 30 (pouch 24) 78 × 34 (pouch 20) most of these bear flowers, about 4 are usually sterile.

The coma-leaves are quite white in the lower part, lightgreen in the upperpart (286 and lighter) or nearly white, they are more or less distinctly light-brown spotted at the top on the outer-side. The flower-bracts are light-green (276—281) with a hyaline hairy edge. All the bracts are short and fine hairy on both sides as is also the peduncle.

The first bracteole is rather large, somewhat longer than the coroll-tube, 22 × 13 — 26 mm. long, pellucid-white. The flower 45—50 mm. long always arises 10—15 mm. above the bracts, except in the leaves of the coma, where flower and bract are about the same length.

The calyx is at the top almost truncate with 3 unequal toothlets of which the smallest is connate with the largest and separated from the third one by a short split, with a rather long split on the dorsal side between the 2 larger toothlets. Length 11 mm. split 4 mm.; corolla 50 mm. Tube 16, ring 2, faux infundibular, narrowed, 14—15 mm. Lab. with broad semiorbicular mid-lobe, 8 mm. broad, projecting 3 mm., incised with round lobules. Lab. narrowed at the base, 17 × 17, only 12 mm. broad at the base. Faux 13—14, when flattened 25 mm. broad. Staminodes elliptical, more or less falcate, somewhat widened at the top with a deep longitudinal wrinkle, with an obtuse top, 13—14 × 7, filament (the free portion) 4 × 4. The dorsal corolla-lobe is 14 × 11, nearly glabrous at the top. The side-lobes are rotundate-ovate, 10 × 9. The anther is large and narrow, the spurs, curved aud very acute, are nearly as long as the loculi.

The rounded top of the connective which is somewhat longer than half of the loculi does not form a distinct lingula.

The colour of the petals is snow-white, the flower is for the rest very pale-cream-yellow, the middle-band of the lip dark-yellow.

Distribution. The species is cultivated in Western Java (Banten, Soemedang) and central Java (Djocdja) and grows spontaneously in the teak forests; from oriental Java I did not see any specimens. But there is a specimen collected by BACKER (11579) on mt. Wilis at 900 M. "dispersed among shrubs", which most probably belongs here, the brown costa and white bracts being mentioned by the collector. Though flowering abundantly throughout the whole raining season, it does not appear to fructificate.

Outside of Java it is unknown, but specimens of other regions occurring in Herbaria would certainly be labelled *C. longa.* But it does not occur among the rhizomes sent from Singapore.

The species was certainly known to RUMPHIUS and it is either this species or *C. viridiflora* which is represented by tab 68, wrongly quoted as *C. Zerumbeth* by most authors. The likeness of RUMPH's tabula 68 to our species is striking. The tuber described by RUMPH by the name of "*tis*" or "*dingin*" (= tinggang ?) might be a young plant of this as well as of any other species.

Native names: Certain names in occidental Java: "*tinggang*", or "*tis*", sometimes "*pinggang*", in Djogdjakarta "*gelenje*" or "*belenje*".

Curcuma viridiflora, Roxb. (1820 I. 34) Bl. (1827,46).

Bulbus conoideus, rhizomata crassa, verticalia et horizontalia magna, repentia, semper leviter falcata; rami crassi haud densi, plerique mox elongati et falcati. Omnia extus lutea, intus sordide aurantiaca, partes novellae luteae et dilute luteae.

Tuberi filipenduli fibris longis pendentes, majusculi, ovato-fusiformes, intus cylindro centrali luteo, cetera grisea.

Caulis sesquimetralis. Folia late elliptica ($P = 2.2 - 3.1$) et (summa) elliptico-lanceolata; extima brevissime, cetera modice petiolata, basi, ob partes valde incurvatas, specie rotundata, explanata obtusa vel acuta, decurrentia; albido-marginata, apice breviter acuminatissima, tota intense viridia, subglaberrima, apice minutissime pubera.

Ligulae lobi angusti glabri, vagina margine puberula.

Inflorescentia centralis cum scapo et foliis peduncularibus praecedenti similis, bracteis comae late patentibus, inferioribus erecto-patulis apice patentibus. Tota infl. cum pedunculo minuta puberula.

Bracteae inferiores et medianae pallide virides, $^1/_2 - ^1/_4$ parte basi adnatae, bursas latas paullum convexas sistentes, late ovatae, infimae paucae tantum late rotundatae, pleraeque ovatae, obtusae vel acutiusculae, superiores, circ. 15, lanceolatae acutae totae niveae vel summo apice punctulis raris vix distinctis purpureis notatae.

Bracteolae tubum corollae superantes Flores inter minores bractea toti inclusi. Corollae tubus latus. Faux cupularis, ostio lato. Staminodia magna apice rotundata subflabellata. Labellum late unguiculatum, lamina latiore quam longa, lobo mediano brevissimo bilobo, haud prominente, a lateralibus semi-orbicularibus non nisi plica separato. Filamentum circ. aequilongum ac latum. Anthera magna calcaribus validis thecis subaequilongis basi curvatis ceterum subrectis acutis, lingula connectivi brevissima.

Tuber and rhizomes as in *C. purpurascens*. As there the orange-yellow colour of the rhizomes (176) is mixed with a brown tinge and at the top the colour of the section passes into a nearly pure yellow.

The largest pendulous tubers, on 160 mm. long fibres are ovate, with a blunt top, 50 × 25. The endodermis is gold-yellow (236), the rest very light-ash-coloured.

The leaves of a young vigorous plant with 5 leaves are elliptical with an obtuse, nearly rounded base and short-stalked, (petioles 35—60, sheaths 150—260). The broad edges of the sheath with the ligula-lobes project laterally on each side to 5 mm. of the base of the petiole. At the inner side the latter converge to form a "V".

As well the sheath-edge as the ligula are very finely or hardly puberulous; the latter is very finely ciliated. The leaves are long 300 × 145, 390 × 170, 260 × 120, 340 × 160. P = 2,2.

Of an old flowering plant with 7 leaves, where the spike appeared laterally between the sheaths, the petioles are long 100 — 320. The oldest leaf 400 × 180, the youngest 600 × 140. P. is on average 3,1. In this plant the ligula is less protruded laterally and some of the projecting tops are coarsely ciliated, the base of the leaf is more acute.

The colour of the leaf is dark-green (304), much darker than in related species, the nerve is colourless, without any brown, even in the first-formed leaves; the surface is hairy when young, as it is in the preceding species, but less copiously and the hairs are shorter.

The central spike has two sterile bracts and no peduncular-leaf. The inflorescence is often 170 × 80 — 100. It is very finely hairy like the peduncle which is about as long.

The coma-leaves (about 9) are as in *C. purpurascens* much longer and more acute than the floral-bracts, 60 — 75 mm. long, they end in a mucro.

The 6 lower bracts are somewhat longer than broad; the average floral bracts more narrowly ovate than in *C. purpurascens*; in dried material this difference not to be observed. The outer sterile leaf of a rather large spike with 40 bracts was 60 × 45; the average floral-bracts (40 – 45) × 30, having 17—20 mm. wide pouches.

Intermedial bracts 55 × 30, pouch 20; one of the lowest of the 15 bracts of the come 75 × 20, pouch 20.

The 15 coma-bracts are snow-white with or without sporadic light-brown dots at the top; partly light-green-striped. The floral-bracts light-green.

The flowers smaller than in *purpurascens* but much broader in all parts; they do not protrude above the bracts. The bracteoles are at the utmost 26 × 16. In a flower of 45 mm. length the calyx is nearly as in *C. purpurascens*, but smaller, 9—10 mm. Petals 11 × 11, dorsal petal 14. Tube 17 mm.; faux 14 × 30. Lip 16 × 18, 13 mm. broad at the claw which is 2 mm. long. The shape is transversally oblong, the broad mid-lobe does not protrude but is separated from the broad short side-lobes by a wrinkle. The staminodes are 14 × 9 with a deep wrinkle, elliptical, broadly rounded, a little incurved; filament 4 × 4. Large anthers with broad long, conspicuously curved and much spreading spurs, somewhat shorter than the loculi. No distinct lingula, stylod. 5 mm. long.

The colour of the flowers is light-cream, the middle-band and lobe of the labellum gold-yellow with a little brown stripe on both sides of the middle-band reminding *C. zedoaria* and *C. latifolia*, Roxb. The petals are very lightpink especially at the top, the buds somewhat darker.

Distribution: The species here described is doubtlessly the same which BLUME indicated by the name *C. viridiflora*, Roxb. and there is nothing in ROXBURGH's description which is contrary to this determination. The type specimen of ROXBURGH's description was collected in Sumatra (Bencoulen) and sent from there to Calcutta, where it flowered.

In Java this species seems to be rare. My description was made up after a single living stock (cult H. 40) and a spike preserved on alcool, collected in Banten.

"Native name." "*Tinggang*" just as the preceding species, of which the rhizomes can not very well be distinguished.

Either this or the preceding is doubtlessly RUMPH's *Curcuma domestica major*, represented in tab. 68.

ROXBURGH mentions the native name "*giri*" or "*giring*" and reduces it to *Curcuma giring* of RUMPH but this reduction is manifestly wrong. It is "however" possible that "*giri*" or "*giring*" is used for this species in Sumatra. But this point of ROXBURGH's text is not very clear.

Though this species is not easily to be distinghuished from *C. purpurascens* by dried materials, in a living state the two are different in many aspects. In fresh specimens the dark concolorous leaves of the first are very conspicuous; the flowers do not protrude beyond the bracts and are much shorter and broader and the midlobe of the lip is not prominent and the dark yellow band is bordered by two red lines.

Curcuma colorata, Val. n. sp.

Herba florens circ. uni-sesquimetralis. Bulbi sat magni, ovoidei. Rhizomata ex omni parte bulbi oriunda, horizontalia et plus minus verticalia, semper cylindrica et falcata, apice acuto sursum incurva, rarius elongata et sigmoidea, ramis secundariis mox elongatis, sursum incurvas et rhizomati aequalibus. Omnia teretia, 20 — 22 mM. crassa, extus pallide brunneo-lutea, intus aurantiaca, squamis trigonis pallide brunneis. Radices filiformes, plures filipenduli et valde elongati, tuberi penduli ovato-fusiformes, endodermis et cortex internus aurantiaci (pleroma griseum).

Folia 4 — 8 in planta florente, longe petiolata, oblongo-lanceolata basi rotundata et induplicato-acuminata, saepe obliqua, apice sensim attenato, vulgo 3,2 (3,5 — 3,9) × longiora quam lata, 4 primaria magis minusve ovata basi latius rotundata sub inflorescentia angustiora nunc valde elongata, nunc diminuta. Folia intense viridia, versus apicem subpuburela, costa media supra concava rubra vel atro-purpurea *(parenchymate attingente semper viridi)* in foliis primariis, in plante adulta sensim pallidiorc; demum saepe viridi; costa subtus viridi parenchymate nunc purpureo transfuso.

Inflorescentia centralis breviter vel longe pedunculata, pedunculo toto vaginis incluso, petiolis longe superata. Laminae sub spicam normales vel plus minus diminutae, folium pedunculare singulum saepius bracteiforme trigono-ovata, dimidio inferiore saccatim adnata, bursae floriferae infimae applicatae.

Bracteae haud densae, *Bursae latissimae*, sat profundae, in parte inferiore spicae *longiores quam partes liberae*, in medio spicae iis aequilongae, haud valde convexae, consistentia crassiusculae, arcte precedentibus adnatae. Partes liberae *latiores quam longae*, late ovatae, apice *late brevissime rotundato-apiculatae*, suberectae apice patulae. Bursae superiores angustae, partes liberae ovato-lanceolatae medio latissimae, patentes, basi marginibus sursum incurvis constrictae. Bracteae comae apice submucronatae, fere omnes fertiles.

Bracteae florales pro parte virides, apice scarlatinae; br. comae fere totae intense carmineae. Flores magni sat longe e bracteis protrusi, pallide aurantiaci, labio aurantiaco. Bracteae puberulae; pedunculus tenuiter pubescens.

A flowering plant, measured, attained 1,2 M., which appears to be the mean height, though one very robust specimen cultivated by Heyne (H. 35) attained 1,60 M.

The rhizomes spring from the opposite sides of the bulb as well as from the base. The primary rhizomes are short or mediocre from 50 — 100 × 20 and produce similar branches mostly on their lower side only; all curve upward at their top and the sessile tubers form one sided or rarely alternating rows along the main branches. Externally the colour is

a sordid bright orange with light brown scales, the conical terminal buds are white. Internally all parts are deep-orange (156), the pendulous tubers grey with an orange coloured inner cortex.

The leaves are oblong- or subovate lanceolate, with a somewhat obliquely acuminate base, attenuated slowly to the acute point ending in a short cauda; the first leaves are comparatively broad rounded at the base and constricted and acuminate at the canaliculate petiole. Here P is 2.25 — 2.2.

The leaves become rapidly longer when the plant grows, and become elliptical-lanceolate. The average length of an older flowering plant is 450 × 140 + 170 + 350; of a larger plant 550 × 150 + 230 + 400. The largest measured leaf of a flowering plant was 650 × 170 + 200 + 400. P. is 3 or often 3.2 — 3.6, in the highest leaf 4 or more. The plants seem to become stronger and larger when they do not come in bloom. In a not flowering plant (35 H.) the largest measured leaves were 650 × 150 + 200 + 400, 750 × 185 + 250 + 500, 850 × 200 and 720 × 230. The colour is rather dark-green. The hollow midrib is dark-brown-red, which colour never spreads over the parenchyma of the upper surface but sometimes appears on both sides of the midrib beneath.

In an older period the red colour vanishes sometimes nearly, especially in leaves which orginate in a dry period; but nearly always a light-brown tinge remains slightly visible near the base.

The ligula is very little developed and consists only of two bows which are convex upward, confluent in the lower part into a concave bow and mostly not broader than a half mm., almost glabrous, not auriculate neither protruding.

The inflorescence is cylindric with a dilated coma (160 × 70 in the midst, × 100 near the top) the length varies between 120 — 200, the peduncle from 200 — 650. The spike protrudes a little above the sheaths but is surpassed by far by the long petioles. The peduncular leaf has sometimes the form of a common leaf with sheath adnate to the peduncle, 450 mm. long and 110 mm. broad, with a 130 mm. long petiole surpassing the spike; in this case the undermost bract bears a flower. But oftener the peduncular leaf is represented by one or two of the lowest bracts which are much taller than the rest, sterile, adnate for one half of their length, trigonous-ovate, obtuse.

The bracts are adnate for $^2/_3$ to $^1/_2$ of their length forming broad and very convex poches narrowed at their base while the free parts are erect and continuing the pouches, constricted at their base while their top is expanding. The free parts if flattened, are ovate broader than long a little narrowed at the base with a somewhat acuminate but very blunt summit.

The length of the 7the bract of a mean spike is 46 mm. of which 30 mm. are adnate and only 16 mm. are free, the width is 30 mm. but the pouch is narrowed at the base. The 23the bract (intermedial) is 60 × 34, adnate only 25 mm. the free part 35 mm. long. Of an other spike consisting of 28 bracts the mean size of the 14 lowest bracts was 16 — 18 (free part) + 22 — 23 (pouch) × 25 — 30. The intermedial bracts measured 32 (fr. p) + 30 (pouch) × 30, 30 + 26 × 27 and 29 + 20 × 28. The tallest of the coma-bracts measured 70 × 25.

The 3 or 4 superior coma-bracts are dark purple mostly 577 and 578 but varying between 576 and 583, the following are white or light green at the base, striped in the middle. The intermedial bracts (bract No. 23 from the base) are green and violet striped down the middle, violet at the top. The floral bracts are light green with a violet top, the undermost almost wholly green.

All bracts are puberulous and shortly ciliolated. The flower is rather large (50 — 60 mm.) and protrudes a good deal above the bracts. The bracteole is 20 — 25 mm. long, or in another spike 28 — 30. It is white with a pink top. The calyx is 9 — 10 mm. long subtruncate with three very small ciliate teeth and with a short fissure.

Corolla-tube 18, faux 18—22, Labellum 18 × 18 with a narrowed base. Stamd 16 × 10, broad, flabellate, filam. 3. 5 × 4, anther (without the spurs) 5 mm. Spurs feebly curved, thin, 3 mm. Dorsal corolla-lobe 15 × 14, lateral 12 × 12.

The whole corolla is pale orange-coloured (171 — 0.171), the medial band of the labellum 151. The coroll-lobes very pale pink (0596), the bud pink.

Distribution and native names. This species grows spontaneous in the teak forests of all parts of Java. I also received specimens of the Yang plateau from Dr. JESWIET and Mr. BACKER collected it on mt Wilis at 300 M. (BACKER 11348). According to information taken by Mr. KALSHOVEN the rhizome is not used by the natives in the central parts of Java. In West-Java it occurs sometimes at the passer but without a proper name; sometimes it was sold by the name "*tis*" or "*tinggang*" (just as *C. purpurascens*) (HEYNE c. 35). In east-Java (Pasuruan) the less clever expert natives called it "*tema labak*" (= *Curcuma xanthorhiza*) and from Tjabak (Rembang) I received it with the name *temu kètèk* ("monkey turmeric"). Also from Randublatung (K. 1645, no native name). It is a beautiful species easily recognized by the broad dark purple coma, the tall flower stalks, the large orange coloured flowers, the tallest flowers of any *Curcuma* of Java, the peculiar form of the lower flower-bracts which are adnate above the middle with expanding, narrowed, very blunt tips. It has some resemblance to *C. petiolata* and would be placed by BAKER in the subgenus *Hitcheniopsis*. By the flower however it is a true *Eu-curcuma*.

Outside Java the species is still unknown.

Curcuma euchroma, Val. n. sp.

Herba sesquimetralis. Rhizomata saepe elongata, merithalliis brevibus, bulbos numerosos florentes approximatos serialiter producentia, basi ramis numerosissimis clavatis et falcatis cum ramulis falcatis obsessa. Extus et intus lutea vel pleromate aurantiaco, cortice flavo temporis decursu sordide aurantiaca. Radices filipenduli longe stipitati interdum intus toti lutei.

Folia adulta longe petiolata subobovato-lanceolata 2.5 × longiora quam lata, versus apicem rotundato-attenuata sat abrupte acuminata, basi latiuscula in petiolum canaliculatum sensim constricta. Ligula cum margine vaginae puberulo ciliata lobis lateraliter vix prominentibus.

Inflorescentia raro longa, pro ratione lata, cum pedunculo vaginis incluso longitudine varia. Bracteae externae vulgo 2 cassae, folium pedunculare nullum. Bracteae florentes late ovatae acutiusculae, late patentes et subrecurvae, dilute virides vel pallide flavo-virides haud rubro-maculatae. Bracteae comae antice punctulato et striulato-lilacinae, basi colore pallidiore et viridi-commixto.

Bracteolae vulgo tubum corollae paullum superantes apice viridiusculae. Flores dilute cremeae lobo mediano flavo, petala dilute rosea. Calyx tubi corollae fere $^{2}/_{3}$ aequans, dentibus subtruncatis. Staminodia elliptica.

The bulb of a 3 months old plant, which already flowered, was 80 × 40, the 6 lowest rings already stripped of the leaves; numerous clavate rhizomes (110 × 25) originate from this tuber; two opposite continue to grow horizontally in a vertical plane and form new merithallia and plants, so that sometimes five flower-bearing plants lay in one row, which develop alternately from the inside to the outside. The branches of all degrees grow upwards in a curve. The colour of the young rhizomes is bright-orange-yellow (161) the tops are white. The old tuber and old rhizomes are, at least in one specimen examined, bright-orange almost 156, pleroma sometimes 151, bark 161. The young and growing parts 161 to 176.

The tubers are pendulous on long fibres, their colour is in one of our specimens quite orange-yellow on the section, nearly as in *C. xanthorhiza*, but not so dark.

The leaves are different in shape from those of the apparently very similar *C. colorata*, though the young plants resemble each other very much. In both the base is broadly rounded and the midrib on the upperside more or less dark-red-brown coloured, without passing of the colour over the parenchyma; in both this red colour becomes more faint during the growth and the young plants seem then superficially quite green, the colour, however, does not vanish entirely. But there is in the shape of the full-grown leaves an important difference with *C. colorata*. The greatest width is here always above the middle and the leaf-edge passes with a rather wide bow to the top which is narrowed into the acumen. Also the average broadth of the leaf is always greater than in *C. colorata*. E.g. In a young plant: 570 × 195: P = 2.3. 530 × 205: P = 2.5. 500 × 198; P = 2.5. 460 × 180 190: P. 2.6. 450 × 170 160: P. 2.6. 400 × 160 100: P. 2.5. 260 × 120 45: P. 2.1.

The average of P. in 8 leaves of a large flowering plant was P. 2.5. or without the oldest leaf = 3. The petiole was 110 — 240 long, except the oldest leaf, which was only 50 mm. long. The largest measured leaves were 630 × 200 and 620 × 225 and in a stronger specimen 720 × 250 + 25 (P.2.7.); the sheaths 400 — 500. The sheath is externally more or less hairy near the top. The ligula-lobes protrude a little with a hairy edge.

The peduncle has mostly no peduncular leaf but sometimes there are two empty bracts at the base of the spike of which the outmost is large (80 × 50) and circularly adnate round the stalk. For the rest one empty bract of the common bluntly triangular shape, is always adnate for a $^1/_3$ (60 × 40, of which 20 adnate). The bracts are arranged 3 + 5; the head-curve is directed now to the left, now to the right, both equally frequently happens, also the 2-spirals, are very distinct in the same direction as the 5-spirals, but with a lower pitch. They are proportionally large, ovate, rather acute, always free more than the half, except a few of the lower ones, which are more adnate. The pouches are wide, free portions not much incurved, with much spreading tops; the 4 comabracts are somewhat more incurved at the base, more flattened in the upper part, obtusely mucronate.

The colour is sometimes light-green 276 and 286, then again very pale-yellow-green. The coma-leaves slightly violet-dotted (587 — 597) in their upper half, downwards (0571) lighter and sometimes green-striped. The intermedial bracts green and violet-striped, and with pink tops and spots.

The flower is diluted-ochraceous (221 — 216) the medial band 201; the petals somewhat pink, 17 or 53 A. or 578 A. The bracteola is somewhat longer than the tube, to 25 mm. The calyx is as in the related species, the teeth distinct, blunt, mostly provided with a ciliate crista.

The flower is much smaller than in *C. colorata*. The longest flowers were 50 mm. of which the tube with the hair-ring is 17—18. The calyx 10—11. The faux is 13—15 mm. long and 27—29 broad. The lip 17 × 16 or smaller, the claw 2.3 mm. long and 12 broad, the top rounded, the mid-lobe a little prominent in the flattened lip. The staminodes, measured in the centre 15 × 10; broad, elliptical, blunt with a shallow wrinkle rather in the middle. The filament is 6 × 4 of which 2 mm. is connate with the staminodes. The anther large, with the long curved spurs 8 mm. The stylodes rather more than 6 mm.

Distribution and native names.

The species is described from three cultivated specimens of different origin of which the rhizomes belonged to the most intensely orange-coloured. From Modjokerto Mr. HEYNE received them under the name of "*Kunir batok*" (449), from Kediri as "*Temoe prit*". (52). From Madura (Soemenep) under the name of "*Temoe lati*", a substantially similar form but with more yellow rhizomes.

To this species I reduce more or less varying forms found spontaneous growing in the teak forests of Rembang (Randublatung), Bondowoso and Kediri. A form particular by the large calyx and the triangular petals, but otherwise similar was sent from Bondowoso as "*Temu ladi*", (cult. HEYNE 700). All those names are very local and uncertain. The following numbers of the HEYNE-culture garden, all of teakforests, belong here.

H. 690 "*Temu ketek*" Bondowoso, flowered.
H. 688 "*Temu giring*"? Randublatung.
H. 682 Kediri, flowered.
H. 702 "*Temu glenjeh*" Kediri, flowered.
H. 700 "*Temu ladi*" Bondowoso, flowered.

Curcuma ochrorhiza, Val. n. sp. Comp. *C. amada*, Roxb. 1820 I 33, Rosc. 1830t.

Herba adhuc juvenilis nunc parva. Rhizoma e membris brevibus haud crassis leviter curvatis horizontalibus et verticalibus compositum, apice acutis, valde ramosis, gemmis a latere inferiore oriundis. Omnes partes extus albidae, intus dilute subviride sulfureae. Gustus leviter carotinus.

Bulbus circ. 35 mm. crassus, intus albus, sulfureo-tinctus. Rhizomata 30 — 70 × 15 — 25 mm. Folia latiuscule oblonga caudato-acuminata basi subrotundata in herba adulta 330 × 140, pet. 100, vagina 140; vagina ad ligulam subdilatata haud auriculata. P. 2.3. — 2.7., inde ab initio *concoloria viridia*. Folium pedunculare breve ovato-oblongum obtusum. Bracteae cassae nullae.

Spica nunc parva sat densa. Bursae haud profundae. Bractearum mediarum pars libera late oblongo-ovata, apice obtusissima. Bracteae totae 45 mm. longae quarum bursa 20 mm., lat. explanata 30 mm., medianae omnes totae pallide virides. Br. comae obovatae obtusae vel superiores acutiusculae haud prominentes 50 — 55 mm. longae, bursa ± 13 mm. longa, *albidae apice roseae.*

Flores iis *C. euchromae* similes pallide flavae (221), labellum medio luteum (201), apice (lobo mediana) brevissimo patenti haud decurvo. Petala pallide rosea (53 A, apice 22) late ovata, apice rotundata, labello breviora. Pet. dorsale late ovatum cucullatum, rostello parvo trigono. Staminodia late obovata apice subacuta medio plicata. Anthera majuscula, thecis versus basin attenuatis, tuberculo insigni, calcaribus validis falcatis, filamentum latum.

Flores 45 mm. longi, calyx 9 mm. cor. tubus 16—20 mm., apice 9 mm. latus. Pet. dors. 15 × 14, rostello 2 × 2, hirsuto, lateralia 12 × 11. Faux infra labellum 10 mm. × 25. Labellum 19 × 15, parte libera 10 mm. longa. Staminodia petalo longioria medio 14 mm. long 11 mm. lata. Fil. 5 × 5. Anthera 4 mm., cum calcaribus 7 mm. Stylodia cylindrica apice crassa 5 mm longa. Ovarium cum basi calycis hirtellum.

This species is named from the externally and internally white, in the center greenish-lemon tinged, rhizome, never met with in any other one of this group. It belongs very near to *C. brog* by the green leaves pale flowers and whitish bracts. Whether old stocks can reach the same dimensions is still incertain.

The young rhizome has a faint taste of mango or carrots.

It was sent (only once) from the teak forests of Randublatung bearing the fancy name of "*Temu lawak*" (= *C. xanthorhiza*, Roxb.) and cultivated. HEYNE 705. Flow. Nov. 1917.

This species appears rather nearly related to *C. amada*, Roxb. (Fl. ind. I 33) of which ROSCOE (1830, t. 99) gives the following description: "Coma rosecoloured, corolla pale yellow or strawcoloured, lip obscurely threelobed, yellow. Spike central, plant entirely green. "Bulb a conical tuber; palmate tubers at the base, thick fleshy, fingered, inwardly pale yellow. Pendulous tubers farinaceous pale. Fertile bracts pale green or strawcoloured."

"A native of Bengal, known as "amada" or mango-ginger, because of the peculiar smell of the rhizome which is used as a medicine."

These species are thus different by the colour of the petals and of the bracts. Moreover the rhizome of *C. ochroleuca* has only a very faint smell of mango, and is not used medicinally in Java. It differs from *C. brog* by the obtuse bracts of the spike.

Curcuma soloensis, Val. n. sp.

Herba metralis vel sesquimetralis. Bulbus et rhizoma fere precedentis, elongata, rami sat longi falcati et clavati omnia extus juventute pure, demum sordide, aurantiaca. Tuberi penduli intus grisei endodermate luteo.

Folia modice petiolata, late lanceolato- et ovata-elliptica, basi subrotundata, apice sensim acuminata, crasse herbacea, inde a juventute plane viridia. Ligula in utraque parte petioli basi auriculatim prominens ciliata et cum vaginae margine hirtella.

Inflorescentia cum pedunculo 300 — 750 mm. longa. Folium pedunculare singulum vel dua, bracteiformia, externum bracteis ceteris duplo longius. Bracteae pallide virides, ovatae (cum pursa obovatae) acutiusculae, marginibus paullum erectis incurvis pallide virides, patulae. Br. comae partim roseae, ellipticae apice mutico. Bracteolae corollae tubum aequantes. Calyx apice truncatus, mucronibus nullis. Corolla pallide aurantiaca, labelli parte mediana intense aurantiaca. Petala pallide rosea. Staminodia oblonga obtusa medio plicata.

The root-system is again much like that of *C. purpurascens*. An old tuber is 60 × 45 and internally dirty-orange (almost 181). The rhizomes 100 × 25 are sallow-orange-brown (181), a side-branch is 60 × 20; a side-tuber 80 × 20. Young rhizomes are pure orange-yellow on the section (161).

The pendulous tubers are ellipsoidal and pass again into roots. They are internally light-grey with a yellow or lemonyellow endodermis (206–186).

A flower-bearing plant has 8 leaves, the petioles of the 6 middlest of these are successively 50,110,150,180,260,300, the dimensions 290 × 125, 360 × 155, 450 × 180, 480 × 185, 550 × 175, 525 × 190, 510 × 190, 510 × 170. P. is average 2.5; in the narrowest leaf 3; in the youngest not full-grown leaf but one; 3.8. The leaves belong thus to the broadest.

The colour is light-green (303) without any brown in the mid-rib of the first leaf. The backside between 312 and 317. The base of the leaf is first seemingly rounded by the folding of the edge.

The sheath and leaf-edge as well as the ligula entirely finely hairy. The inflorescence which appears in the common way between the leaf-sheaths, has a bract-shaped peduncular leaf, placed very near the inflorescence and as usually triangular shaped. (60 × 60). In the examined spikes are ± 30 bracts, which are broadly ovate, rather blunt, not acuminate, but they form with their upcurved sidelobes shallow wide gutters which for a greater part, are longer than the wide pouches, only some of the undermost are as long or somewhat shorter. The coma-leaves are broad, rather blunt and without a mucro. Of the above mentioned spike, the average (lowest) bracts measured 46 × 34, another, 50 × 34, of which just the half formed the pouch; a coma-leaf measured 72 × 36, pouch 20. The colour of the lowest 14 bracts is very light-pure-green (286 and 291). Higher upward the tops become spotted violet and the lowest half of the 6 coma-bracts is nearly white, the middle pink, the top rather dark-violet (587, 578 and 578 B.)

The coma-bracts are, especially at the top, on both sides and on the edge short, not densely hairy. The edges of the bracts are very short hairy.

In each pouch are three flowers which occasionally protrude especially below, but most of them do not. The bracteoles are not longer than the tube.

The structure of the flower is like that of C. *purpurascens* etc. The labellum, however, is less protruded and the whole fore-edge is entire with a small incision at the top. The colour of the petals is very light-pink (3 A.), the lip etc. common orange (171—166, mid-band 156). The teeth of the calyx are nearly truncate and want a mucro at the top. The corolla is slender. By a flowerlength of 48, the greatest breadth of the faux (when flattened) is 22 — 25, the tube is 16—18 mm. long, the faux 15 mm. the lip (when flattened) 15—16 × 16—17, narrowed at the base into a claw; the staminodes oblong-elliptical, blunt, narrowed at the base and inward bent at the top. The filament (the free portion) is 4 × 4. The lateral corolla-lobes are broadly rounded, oblong-ovate, the dorsal lobe is glabrous and has an oblique mucro which is hairy. The stylodes are 5 mm.

long. The anthers are proportionally short (7. 3 × 3) with a ligula, protruding between the thecae. The spurs curved and firm, at the top somewhat outward bent.

Distribution and native names:

This species Mr. HEYNE received from Solo under the name of „*gelenje*" or "*belenje*" (HEYNE, 50) and under the same name an apparently identical plant from Kediri, (HEYNE, 55), which, however, has not yet flowered, and another specimen from Poerworedjo (flower bearing). Finally I received living plants from Randublatung (Rembang), flowering in Decembre 1916 and again in Aug. 1917, through the kindness of the bureau of forestry. The name seems to be rather universal for this species in Central Java. Probably it is this species which is commonly known as "*temu kopyor*", used by the natives for dying purposes. Though this name may be applied also to some related species.

The species, sold in Djocja at the bazar, under the name of "*gelenje*", is, however, another species, to wit *C. purpurascens*, Bl. I perceived this as well from a written information of Mr V. ZYP, as by a flower-bearing specimen sent to me by Mr. HJ. JENSEN from Klaten.

To this species I reduce provisorily, until better material for study is available, some small plants growing in the teak forests and called by diverse local names, the most commonly used of which are *T. ladi* (red and white form) and *T. putri.*

Diverse stocks are grown in Mr. HEYNE 's culture garden under the numbers 683, 685, 687, 691 and 701, which belong to this group, of which 685 is from Kediri (sub nomine locali "*temu giring*") the rest from Rembang (Randublatung).

The only one of these which has flowered (HEYNE 691) has orange-tinged flowers like those of *C. soloensis* and green leaves, with exception (sometimes) of the first ones, but the rhizomes are rather different. They consist of very short members not thicker than a little finger, falcate very ramose, vertically and horizontally, the principal ones *reflexed upward with a geniculate bent* and then growing to an oviform erect annulated bulb 50 mm. long and 25 wide. The colour is constantly 181 Cod. in 683 H. 176 in the other numbers. These short abruptly upcurved rhizomes remind those of *C. petiolata*, Roxb., called "*T. putri*" in Batavia, which however is a very different species. Here is also to be mentioned a form from these same forests known as "*temu gepijitan*" or "*temu ladi*". (KALSHOVEN 1642, flowering Dec. 1917), with a dark purple coma, and which is probably a different species but still badly known.

Curcuma brog, Val. n. p.

Tuber parvus, globosus vel cylindricus. Rhizomatis rami breves medio leviter inflati, incurvi, extus nitide mellei intus sordide citrini. Radices filipenduli angusti tuberculati intus pallide flavescentes. Folia plane viridia, laminae basi acuta, P. 2.5.—3,25. Ligula glabra, ciliata. Inflorescentia magna densa, bracteis 50 vel pluribus, longe pedunculata, habitu *C. euchromae*. Bracteae comae lanceolatae valde acutae vix distincte mucronatae, purpureae infra medium pallidiores, intermediae viridi- et albidostriatae, florales pallide virides (91) basi albidae, late ovatae, valde acutae patentes, subcanaliformes et subrecurvae, pursis dimidium bractearum haud superantibus plerisque brevioribus, latis haud valde convexis.

Flores iis *C. euchromae* sat similes sed minores et pallidiores, labelli lobo mediano citrino, corollae lobis insigniter minoribus, staminodiis longioribus, angustioribus.

Bulb round 45 × 45 or smaller, or cylindrical, vertical, densely annulated. Primary and secundary rhizome branches growing horizontally and vertically, short, cylindrical, often swollen in the middle or clavate, 50—60 × 20, consisting of 9—11 internodes, falcate, resembling long maggots, shining lightbrown, appressed setose. The edges of the internodes, with small thornlike appressed processus. Internally the bulb and rhizomes are sordid lemon-yellow, 236—241—266. Young rhizomes externally yellowish white, pointed, internally pure lemon-yellow (211). Roottubers slender, 50 × 12, internally very pale yellowish.

Leaves rather broadly lanceolate, e. g. 500 × 200 + 200 + 400, 575 × 175, 500 × 180, 650 × 200; average P. 2.5—3.5.; all quite green. Flowering stem 600 mm. high, peduncle 13 mm. thick.

Comabracts rather numerous (8), acutely lanceolate, with an almost obsolete mucro, upperhalf redviolet, 556, almost white at the base, with very short pouches, 75 × 20 mm., (pouches 15). Intermedial bracts palegreen with violet stripes 55 × 26 (pouch 25.) Mean bracts pale yellow-green (291), 45 — 50 × 28 — 25, pouches 20 — 24. The shape of the mean bracts is broadly ovate like those of *P. euchroma* more acute at the top. The sterile inferior bract is widely trigonous, 40 × 40 and 50 × 35. No peduncular leaf.

The flowers resemble those of *C. euchroma* but are distinct by the longer calyx (13 mm. in a flower of 50 mm.) with truncate lobes, the bracteoles 25 — 30 mm. long. Tube with the ring 20, faux 15 × 25. Side petals ovate oblong rounded, small. (13 × 9). Dorsal petal 15 × 12, broad, cucullate with a large hairy rostellum. Staminodes cream-yellow, 221, very obliquely elliptic oblong, obtuse, 15 × 8. Lip with a prominent endlobe and broad semiorbicular sidelobes 20 × 18, central bar sulfureous, orange-yellow in the bud, 156.

Distribution:

I received of this species flower-bearing specimens from the teak-forest of Randublatung, the species is undoubtedly much related to *C. soloensis*,

but easily to be distinguished by the colour of the flower and the very different rhizomes. It differs from C. *ochrorhiza* by the more acute bracts and the colour of the rhizomes.

Curcuma Mangga, VAL. et v. ZIJP. n.sp.— *Curcuma amada*, VAL. (non ROXB.). in HEYNE (1913, 207). — comp. C. *leucorrhiza*, ROXB. Fl. ind. I. 30; ROSCOË 1830 t. 102.

Exantha. Herba bimetralis. Bulbi globosi vel elliptici, dense annulati. Rhizomata digitum crassa, numerosa ex omnibus partibus bulbi exorta horizontalia vel obliqua, saepe recta, valde ramosa. Rami secundarii et tertiarii ad illos prioris ordinis perpendiculares, breves, congeriem densam interdum maximam sistentes. Gemmae obtusae albae. Rhizoma extus pallide flavescens, apice album, intus dilute flavidum, cortice in partibus juvenilibus dilutiore, fere albo. Bulbus intus pulchre flavus. Omnes partes sub lente puberulae, magis minusve fructus Mangiferae necnon aliquantillum rhizoma Z. *officinalis* redolentes et sapientes, subacres, haud amarae.

Radices filipendulae elongatae filiformes, tuberi fusiformes angusti et elongati utrinque longe attenuati, intus albi, pleromate pallide flavo.

Folia anguste oblongo-lanceolata supra medium paullum dilatata breviter caudata, basi longissime in petiolum decurrentia, saepe 4-plo longiora quam lata, pallide viridia, concoloria. Petiolus mediocris, ligula bisemilunata, cum margine vaginae dense ciliata.

In stirpibus junioribus folia multo minora latiora.

Inflorescentia inter minores ante folia exorta. Scapus squamis vaginantibus 4 — 10 instructus.

Squama superior saepe a caule divergens nunc plane limbiformis, saepius convoluta mucronata, ad 350 mM. longa, basin spicae saepe superans.

Spica apice valde dilatata.

Bracteae inferiores latissime ovatae obtusae sensim breviores et obtusiores, inde a forma ovata ad orbicularem transeuntes, inde (bracteae comae) ad ellipticam, inde ad oblongum, omnes obtusisimae vel rotundatae, utrinque minutissime puberulae, omnes (summis exceptis) florigerae. Bracteae comae basi albae, versus apicem violaceae et rubro-violaceae, bracteae intermediae pallide virides, interdum violaceo-striatae, inferiores pallide virides.

Bracteolae sat magnae tubum superantes. Flores graciles, fauce attenuato. Calyx late obtuse tridenticulatus. Tubus corollae $^2/_5$ longitudinis floris superans, petala lateralia anguste ovata obtusa ; dorsale cucullato-ovatum et mucronatum. Labellum obovatum unguiculatum lobo mediano bifido valde distincte prominente et a lobis lateralibus emarginatione separato.

Staminodia lata falcata apice rotundata. Filamentum parvum, lat. long. aequante.

Anthera angusta infra medium affixa, ligula brevi late rotundata terminata, calcaria longiuscula, haud curvata haud valde divergentia. Flores albi lobo mediano flavo.

During the flowering period the plant grows to more than 1 meter with 2—3 leaves. The primary tuber of an old plant 35 × 35; elliptic mostly perpendicularly lengthened 50 × 25 or 80 × 35. Rhizomes a finger thick, very numerous spreading in all directions, almost straight often somewhat clavate with perpendicular or horizontal side-branches, which soon are branched again. In sterile plants lumps of a foot in diameter are formed by a repeated branching (Pl. VI f. 2). The longest measured rhizome 125 × 20, of which the side-branches are 50 — 60 × 12. The downwards directed side-branches form bipectinate figures by the alternate large buds of which, however, only those on the under-side develop to tertiary short branches.

The internodes are short, the nodes somewhat swollen, mostly provided with ring-shaped lacerate rudiments of the scales (see Pl. VI). The tops are more or less acute or blunt, not rounded. The colour is very pale-yellow with white tops. The section, also of the tuber, is citrine (236); the young offshoots white yellow.

The leaves are elliptical-lanceolate, but broadest above the middle; very long-acuminate towards the base and passing very gradually into the canaliculate petiole; acuminate towards the apex ending in a short filiform cusp.

In a specimen of the Bot. garden, which grows in the shade of the woodgarden and which had still two leaves only, these leaves were 700 × 180 and 500 × 160, viz. from the top to the ligula, being the base of the leaf so much lengthened and narrowed, a well-marked limit of the petiole is wanting. The leaves of another older plant with 4 leaves, were 605 × 160, 700 × 185, 740 × 180, 770 × 556 and the petioles respectively 80, 190, 300, 380, a diameter of 25 mm. being taken as a limit between the blade and the petiole. P. was here thus 3 in the oldest leaf, 5 in the youngest, average rather more than 4. In another plant with 6 leaves the average lenght of the leaf was 580 × 150 (P = 3.8.); petiole 225. Sheath between 500 and 650.

As be said these leaves grow in the shade.

Of a sterile rhizome (91 H) (of "*temu poh*" from Djocja) which grew on an open sunny spot, the length of the leaves at a plant of 7 leaves, was: 350 × 180, 340 × 150, 440 × 190, 570 × 192, 600 × 190, 650 × 170; the petioles from 100 to 200. Here in the 4 oldest leaves P. is 2.2; in the three youngest 3.3. In a fourth sterile plant (of *temoe mangga* from Batavia) the smallest leaf was 510 × 180, the largest 700 × 140, the average of 7 leaves 3.5. The membranous edge of the sheaths protrudes laterally rather far beyond the base of the petiole and passes into the broad lunate ligula; the latter is densely ciliated along the whole edge, also the edge of the sheath is ciliated but less densely.

The inflorescence originates nearly simultaneously with the leaves from a young side-tuber of the primary tuber, the foliate stem from a sidebud of the primary-tuber.

The scales of the peduncle are long 50 mm., rounded mucronate, the internal one (4th) is sheath-shaped, 250 mm. long with a convolute or rarely small, flattened blade. In another specimen the stem was surrounded by 10 sheaths.

The peduncle was 150 — 160 mm. long.

The spike, almost as long as the peduncle, had a violet-red (531 — 551) coma which protruded rather far beyond the spike, the coma bracts (9), however, were white from the base to the middle, the intermedial bracts were light-green, white with violet stripes, the middle-bracts (forming 2 or 3 cycli) were light-green. All are somewhat velvety to the touch.

The bracts (32 in an examined spike) are sometimes all flowering, but the outmost is then somewhat larger than the following, sometimes, however, this is sterile and placed some cm. below the spike and adnate only at the base. Of the middle-bracts (20) the free portions are somewhat longer or almost as long as and broader than the pouches, the 2 — 3 outer ones broadly ovate, the others nearly orbicular with an almost rounded top, they form wide and high gutters which are but little concave and they are much spreading. The average length was rather more than 40, including the pouch which was half as long or less, the breadth was 25. The pouches are narrow. In the intermedial bracts, long 50, the free portions were 30 — 32 × 30 — 32. Of the leaves of the coma the outer ones were broadly elliptical (long 55) the free portion 40 — 45 × 32, the inner ones, as commonly smaller and narrower, 45 × 16, and 42 × 14 all with rounded top withot a trace of a mucro.

The flowers protrude a little above the bracts so that the deflexed middle-lobe of the lip is distinctly visible. The primary bracteole is large, longer than the tube 25 — 28 × 12—14, and quite hairy on the outerside. The flower is 44 mm. long. The calyx is about half as long as the crown-tube and has a small split and 3 very short nearly equal, rounded teeth. The lip is obovate with a much protruded recurved mid-lobe, which is separated from the erected side-lobes not only by a fold but also by a slight emargination. The flattened lip was long 16 × 14, narrowed to a short claw broad 9. The staminodes are nearly elliptical, converging behind the stamen, narrowed at the base, the outer edge convex (14) inner edge 10 (shorter by the connating with the stamen). The filament is small, about 3 × 3, the anther proportionally long and narrow, affixed near the base; the oblong connective projects somewhat between the loculi as a short lingula. The spurs are narrow and parallel, slightly curved. Loculi long 4—5, spur 2—8. From another flower was noted: Length 48, calyx 8, side-petals oblong-ovate (13×8) the dorsal petal 13×10. Tube with the hairring 20; staminodes at the lipside 14, ad the filamentside 11; filament 4×3; lip 17×15; faux flattened 12×22. Tube 18 mm., stylodes 4 mm. The flowers are pure white, the mid-lobe yellow.

Distribution: *Curcuma Mangga* is cultivated in Buitenzorg, Batavia, Djocdjacarta and diverse other localities. I never met with specimens of the type collected wildgrowing in the teak forests or elsewhere and as such it makes an exception to all other cultivated specimens, all of which are occasionally met with in the teak forests, where they often are gathered on a large scale for trading purposes.

The malay name is unvariably *temu Mangga*; in Madura and the eastern part of Java and in Djocdjacarta it is called *"tema"* or *"temu poh"*, *poh* being the Madurese name of the mangofruit. Locally sometimes *"temu badjangan"*, another local name of the mango (Bodjonegoro, according to Mr KALSHOVEN). In Batavia it is called sometimes *"temu lalab"*, this being a medecine made of the rhizome. RUMPH mentions the *"temu Mangga"* with a few lines. He declares this kind not to be well known in Ambon, and mentions the farine and diverse medicines prepared from the rhizome.

Outside of Java this species seems to be cultivated in Singapore. At least it seems most probable that this is the *temu "pauh"* cultivated by the Malays, having "a yellow rhizome, with a smell and taste of wild carrots." (RIDLEY 1899,118). I presume this *"pauh"* means *"mango"*, as well as it does in Atjeh, Madura and in the Buginese land.

This species is not the *Curcuma amada*, ROXB. as I took it to be formerly. (HEYNE l. c.) before I had seen the lateral scape. The spike of *C. amada* as drawn by ROSCOE t. 99, and more especially the median lobe of the lip, rather far protruded, have some resemblance to *C. Mangga*; and the name *"Amada" assumed* by ROXBURGH after a Bengali word, meaning *Mango-ginger*, because of the Mango-aroma of the rootstock, indicates a remarkable analogy to our species. All this however is purely accidental for *C. amada* having a central spike, is not related nearly to *C. Mangga*.

There are two varieties of *C. Mangga*, the first, cutlivated here (C. HEYNE 5) is remarkable by its conspicuous dark purple coloured middle part of the leaf in the young plants, but it has the same taste and aroma of the rhizomes as has the type, and in a full grown state it is not easily to be distinguished from it. Flowers are still unknown. The second should perhaps be considered as a proper species, which combines characters of *C. Zedoaria* and *C. Mangga*, for the flowers show the protruded lip and rather long spurs of *C. Mangga*, while the rootstocks have very little of the *Mangga* type, neither in form nor in proprieties. The first appearing leaves have a narrow purple cloud, the full grown plant resembles *C. Mangga*. This form is interesting because it is the only known species of *Eucurcuma* which fruits abundantly, and thus perhaps represents the only species of *Eucurcuma* which is to be considered as truly spontaneous (see Plate XXX).

This species, especially the variety "*sylvestris*" should be compared to *C. leucorrhiza*, ROXB., which it resembles in many aspects. Most curious is the deflexed midlobe of the lip (see ROSCOE (1830) t. 102 fig. 3.) occurring in both species, distinguishing them from other species. ROSCOE gives the following description:

"Spike lateral; plant entirely green; leaves broad lanceolate, smooth on both sides; spikes few flowered; coma pale rosecolour; petals slightly tinged with purple; lip yellow. Bulb ovate; palmate tubers long and straight; pendulous tubers numerous, far spreading, pearly white within; leaves broad-lanceolate, petiolate smooth uniformly green; plant from 3 to 4 feet high, spike 150—200 mm. high. Fertile bracts green, coma pale rosy. Dorsal corollobe slightly mucronate, all lobes white tinged with purper. Lip white with a purple tinge, yellow and bifid at the apex".

"A native of the forests of Bahar. Tubers of both kinds are used for preparing a kind of fecule, called Tikhur".

According to K. SCHUMANN the ovary of *C. leucorrhiza* should be smooth.

Curcuma Heyneana, VAL. et v. ZIJP. n. sp.

Exantha. Herba elata usque bimetralis. Bulbi ovoideo-vel oblongo-ellipsoidei valde acuti. Rhizomata numerosa vulgo bifaria saepe valde elongata teretia ± clavata, recta vel saepius decurva, horizontalia vel oblique geotropa, vel imo obverse verticalia, nunquam (nisi gemma germinante) sursum incurvata, ramis secundi (vel et tertii) ordinis saepissime angulo recto ex utraque parte rhizomatis aequaliter protrusis, numerosis haud densis longis et brevibus; omnes partes extus pallide griseae vel sublutescentes, sub lente subglabrae, intus pulchre pure flavae, sapore aromatico et amaro.

Radices filipendulae saepe longissimae, tuberi penduli rari, vulgo parvi (oblongo-fusiformes), intus pallide grisei, pleromate nunc sublutescente.

Caulis vulgo 3 — 8-foliosus complanatus. Folia oblongo-lanceolata usque semimetralia vel $^3/_4$ metralia apice breviter caudata, basi sensim acuta, concavo-conduplicata et in petiolum canaliculatum brevem desinentia. Ligula parva, biloba, glabra. Folia sat intense viridia, costa concolore, 2.8 — 3 × longiora quam lata.

Scapus ante folia apparens nunc brevis gracilis, vaginis viridibus saepe 3, quarum superior (folium pedunculare) valde variabilis, nunc subfoliacea et involuta (explicata lanceolata) nunc saccatim adnata, a spica remota vel illi proxima, basi obliqua, apice saepe longe apiculata.

Spica inter minores, late cylindrica, apice dilatata. Bracteae a basi inde omnes (ultimis comae exceptis), florigerae, puberulae, breviter (ad $^1/_3$—$^1/_4$ longitudinis usque) adnatae, inferiores lato-ellipticae acutae subcomplicatae et patulae, superiores oblongo-ellipticae acutae et mucronulatae subplanae, ultimae comae oblongae basi attenuatae obtusae. Bracteae florentes pallide virides et albescentes, intermediae albae et albovirides, supremae pallide roseae apice purpureo.

Bracteolae tubum floris superantes, hirtellae. Flores albi, vulgo exserti. Calyx hirtellus obtusissime dentatus, albus, tubi corollae $^2/_3$ longitudinis aequans vel superans (sed longit. variabilis). Corollae tubus sublutescens brevis in faucem campanulatam latissimam dilatatus. Petalum dorsale latum album, extus totum hirtellum mucrone valido. Labellum flavum subrotundum vix unguiculatum, lobo medio vix protruso, apice bifido lobulis subrotundis sese imbricantibus. Staminodia pallide flava subrotundo-obovata. Filamentum pallide flavum, angustum longum. Antherae prope basin dorso affixae puberulae, apice distincte ligulatae, basi calcaribus brevibus validis subulatis antice subexaratis munitae. Stylodia brevia.

Plant after the bloom growing up to a height of nearly 2 m. and forming 8 or 9 leaves. The primary tuber remains small, not more than 80 × 50, sometimes 40 × 40. The rhizomes progress partly horizontally, but for the greater part obliquely downwards directed (see Pl. V.b.). They are straight or the tops are somewhat downwards curved, never falcate and upcurved, except in the germing endbud.

The rhizome may attain a length of 200 × 25. The breadth of the internodes is 5—10 mm. The young ones are clavate. The side-branches develop mostly at both sides of the long chief branches at a right angle so as to form long bi-pectinate or pinnate bodies the longest side-branches are than long 45 × 15 and they end with blunt white tops. The external colour is light-yellow, afterwards grey. Internally the tuber and rhizomes are pure bright yellow (226, also 236 and 231, sometimes 206 — 211). In older branches somewhat mixed with brown (210).

The roots are partly thick and fleshy, densely covered with root-fibres, partly filiform, they may attain a great lenght (400 mm.) before forming pendulous tubers, which pass again into root-tubers at the top. The pendulous tubers are narrowly fusiform (70 × 18, 80 × 15); their section is white-grey, sometimes with a yellow tinge (246) in the middle.

The leaves are uniformly green, rather broader and less prolonged at the base than those of *C. Mangga*. Of a sterile plant (H. bog. 65. 10) with 6 leaves was noted: sheaths: 220 — 350, petioles of the 4 innermost leaves: 50, 70, 130, 140. Blades 175 × 75, 300 × 110; 330 × 130, 420 × 130 (average 350 × 135, thus P. = 2.4. Of an old plant, which has not yet flowered, the largest leaf, the youngest but one, is 530 × 200 × 150: (P. = 2.6.). A similar leaf of another plant from the Yang mountains, 550 × 165 + 140, (P. = 3.3.).

The ligula consists of two crescents convex above, broad 2. 5—3 mm., which touch each other in the middle of the innerside, forming so a V.

shaped figure; they pass gradually into the broad membranous sheath-edge and they do not form protruded side-lobes. They are nearly glabrous only very near the edge somewhat ciliate.

The inflorescence is broad and short (90 × 70). The colour is light-green, the coma mostly very light-pink with dark tops, the intermedial bracts often quite white. The bracts are all broadly elliptical with an acute top and only $^1/_4$ or (at the coma) $^1/_5$ of their length is adnate with the preceding, so that the pouch consists nearly of the free portion. The bract is little concave and not constricted near the base; the top is spreading with a slight curve. The largest (lowest) bract was 40 × 26, the largest of the coma 50 × 23. The flowers do not protrude outside the bracts. The primary bracteole is 22 × 13, the secondary one 19 × 8. The corolla is broad and short: L: 43, K: 8. Tube short and wide (12.), the faux very wide, in proportion to the length of the flower (when flattened, 23). The lip is nearly orbicular (16 × 16), 10 at the base and there is but little separation between the broad mid-lobe, consisting of two round lobules, and the broad side-lobes. The colour is white with a dark yellow mid-band (Jeswiet.) or quite yellow (V. Zijp.) The staminodes are broader than in any other species, broadly elliptical, above rounded, narrowed towards the base, (14.5 × 11). The filament narrow (4.5 × 2.5). The dorsal coroll-lobe is broadly ovate, quite hairy on the back and at the top. The lateral ones are ovate with a rounded top, upwards narrowed (12 × 10). The stylodia are short (3—4). The anther is recognizable by rather short, straight or curved, much spreading spurs, which are grooved on the face, just as in *Paracurcuma*, and the narrow connective is prolonged to a small lingula between the loculi.

On a specimen from the Yang mountains the dimensions are: K 13, C 44, P.d. 13 × 14, P. 1.13 × 10, F 12 × 25, Lab. 18 × 20, std. 15 × 12, fil, 4 × 3, stylod. 3, Bractea 23 × 14.

Distribution. This species is cultivated universally throughout Java in the villages, and the rhizomes are sold at all bazars with the certain name "*giring*", not used for any other cultivated kind. It occurs also wild growing in the forest of all parts of Java and is apparently endemic. At least no species has been described by foreign authors which can be reduced hereto. Rumph l.c.p. 169 mentions the "*giring*" very shortly; he says that "the rhizomes are long and narrow, internally pale yellow and bitter", a diagnose which may concern our species.

Native names besides "*giring*". are: in Tomo, Soemedang, West-Java: "*djaha*" in East-Java, Pasuruan: "*tema giring*", "*tema litjin*", "*tema konèng*", "*tema lateng*" (local name in mt. Yang.).

Typical specimens were sent from the teak-forest of Tjabak, (Rembang) (central Java) and also from Kritik (Kediri) East-Java, with the name "*temu poh*" a name given unvariably to the *Curcuma Mangga* in Djocdjakarta and

in Madura (see above). RUMPH mentions the name "*pho*" as a Balinese synonym of "*giring*". Locally in Randu blatung-getas and Ngarengan (Rembang) the name "*giring*", is given also to a quite other species, having a central spike and a red leafrib in the older leaves, described above as *Curcuma euchroma*, VAL.; and ROXBURGH (18 20, 34) cites this name, quoting RUMPH, for *C. viridiflora*, ROXB., a species collected in Sumatra (Bencoulen).

Curcuma Zedoaria, ROSC. *C. Zerumbet*, ROXB. Cor. pl. (1791) III t 201; Flora indica (1820) p. 32. — ROSCOE (1828) t 109 — RIDLEY (1899 et 1907) descr. proparte, citatis exclusis.

Bulbus magnus, elongato-conoideus. Rhizomata numerosa per totum circuitum bulbi exorta, brevia, raro elongata, medio incrassata versus apicem attenuata apice obtusissima, rami numerosi, mox iterum ramulosi, saepe doliformes, basi constricti saepe rectangule patentes, extus plumbea vel juniora dilute pallide flavescentia, fere alba, juvenilia intus pallide citrina, pleromate paullum intensius colorato cortice et apice alba, vetusta pallide mellea.

Radices e bulbo nascentes, numerosi, partim filiformes, partim rapiformi-incrassati. Tuberi filipenduli vulgo numerosi, magnitudine varii, interdum permagni, fibris vulgo brevibus; intus pallidi.

Caulis mediocris. Folia elliptica et oblongo-lanceolata, brevipetiolata, basi valde attenuata in petiolum decurrentia, suberecta, intense viridia, supra macula pinniformi lata, intense atropurpurea a basi inde usque ad apicem in utraque parte costae pertensa, costa ipsa rubra vel medio viridescente.

Petiolus sensim in vaginam puberulam continuus; ligulae lobi vix arcuati, angulo obtusissimo divergentes, ad marginem vaginae fere perpendiculares, cum illa hirsuto-ciliati. Scapus illi *C. xanthorizae* similis sed vulgo minor, bulbo novello ex apice rhizomatis enascens, vagina superiore saepe magna lanceolata apice mucronata, adnata, apice basi spicae appressa.

Spica laxe bracteata, bracteis magnis latissimis, basi circ. dimidio adnatis, pursas latas haud valde convexas basi angustatas sistentes. Bracteae inferiores latissime ovatae apice rotundae, summo apice brevissime constricto obtusissimo, in vivo paullum producto patulo; pars libera appressa erecto-patula marginibus incurva et canalem apice dilatatam sistens.

Bracteae comae duplo longiores quam latae, apice obtusae haud vel obsolete mucronatae, breviter vel brevissime adnatae, apice vix ciliatae ceterum plerumque glabrae, rubro-purpureae vel purpureae. Bracteae florentes pallide virides apice vulgo purpureae et interdum purpureo striatae.

Bracteola parva, tubum corollae paullum superans, hyalina rosea. Calyx brevis distincte obtuse 3-dentulus, albus; corollae tubus brevis amplus, $^1/_3$ floris longitudinis aequans, ostium faucis latissimum annulo piloso crasso. Faux lata. Labellum fere rotundum, lobo mediano apice fisso, lobulis imbricatis,

vix prominente, bracteae appresso, haud exserto. Staminodia lata brevia basi vix angustata. Filamentum breve, latius quam longum. Anthera crassa et saepe dorso minute puberula, calcaribus brevibus paulum curvatis. Stylodia longa. Corolla alba apice petalorum vix pallide roseo.

The bulb attains considerable dimensions and is often long conical (60 × 30—100 × 50 or larger). The rhizomes arise in great number about the whole circumference, they soon bend upwards to form new tubers and sympodia. The longest was 100 × 20, internodes 15 to 35 mm. Almost exclusively on the lowerside numerous thick side-branches, of which the largest soon again form tertiary branches. All branches are short and thick, clavate and obconical or barrel-shaped with rounded end-buds, which, by a length of 50, often attain a diameter of 30 mm. The roots are here again fleshy (especially in the young primary-tuber), and cord-shaped, very numerous around the tuber, and on short and mediocre stalks (100 — 250 mm.); they bear a great number of very large and also small pendulous tubers, the largest oblong-fusiform and more than 130 mm. sometimes 150 × 25, the small ones only 25 mm. long. Internally the colour of the central cylinder is light-brimestone-yellow, the bark white..

The colour of the still fresh rhizomes and the buds is externally very light-yellow (246) older ones are shining-lightbrown as if polished. The colour of the younger parts is bright-yellow on the section, the central-cylinder darker (216 to 231); the older parts are dirty-light-brown with a tinge of yellow (honey-brown 182 very diluted) on the section.

The leaf-bearing stem is provided at the base with 2 mucronate scales which are broadly rounded at the top and scariosemargined, it produces 7—8 leaves. These are short-petioled, the outer sessile, elliptical, ending in a rather hard mucro; the other all oblong-lanceolate with a Prop. of 2, 7 in a younger plant, of rather more than 3 in an older one. The latter had 7 leaves of which the petioles were successively 60—210, the outer one measured 440 × 190 (P = 2.3), the inner one was 750 × 190. (P = 3). Commonly P = 3.5—5. The leaves are thus longer and narrower than in *C. aeruginosa* and *xanthorhiza*. The leaves are dark-green and the entire mid-rib from the top to the very base is red or red-brown with a broad feather shaped extension of a dark-purple colour spreading on both sides over the parenchyma, broad 8—15 mm., or in very strong plants to 25 mm., visible on the underside near the midrib. In old feeble plants the spot becomes lighter and narrower but always remains darker and broader than in *C. xanthoriza.*

The scape is from 100—250 mm. long, clothed wih 3 or 4 sheaths or scales, which enclose the peduncle, and are rather broadly rounded at the top. The uppermost of these, the peduncular leaf is 90—220 mm. long, spathulate, quite open, and is inserted 90—200 mm. under the base of the spike, sometimes involute, glabrous, except at the top. The tops of the scales are ovate, those of the peduncular leaf rather acute, all with a mucro.

The spike is usually composed of only a few very large bracts. In the first appearing spikes the number is 13—20, sometimes 24. In older plants the number sometimes becomes greater. The bracts are flower-bearing quite from the base.

They are broadly-ovate for the greatest part, somewhat narrowed at the top and than broadly rounded, not very dense, the breadth much greater than the length of the free portion, and form short pouches, which are wide above and downwards gradually narrowed and which are almost as long as the free portion and rather convex; the free portions are erect, close to the lower ones, and form a continuation of the pouch with an ovate mouth, the blunt top outward bent.

An average bract is large 45 × 25 or 45 × 35, ± 20 is adnate. The coma-leaves 60 × 26, sometimes 60 × 35, very shortly adnate (12 mm.). An intermediate leaf is 58 × 38, pouch almost 25. In another one the intermedial and the coma-bracts were: 55 × 30 (pouch 20); 53 × 35 (pouch 25): 54 × 35 (pouch 23); 73 × 27 (pouch 19).

The coma-bracts are bright-carmine-red, mostly 576 — 582, sometimes 551 — 554, dark-purple in the upperpart, with green stripes at the base; the medial bracts are green-and violet-striped or green with a purple spot at the top only, the three lowest nearly quite green (276 — 281). The bracteole is short, 17 mm., pellucid.

The flowers are broad, compact and short. They are enclosed in the bracts.

The calyx has three rather large rounded teeth. The coroll tube is short and wide, with a wide faux and mouth and a thick ring of hairs. The faux broad, not much narrowed downwards, the lip nearly orbicular, the bi-lobulate midlobes a little prominent by the incurving of the side-lobes, but without an emargination between them. The staminodes are very broad and folded up in the broad, cucullate dorsal petal. The anthers are broad and thick, the spurs almost half as long as the loculi, the connective finely hairy, not produced at the top, the filament short, broader than long, the side-petals ovate.

A measured flower was 40 long, calyx 8, coroll-tube 14, thus almost $^1/_3$ of the length of the flower, the dorsal petal 14 × 12.

Another flower 46 long, C. 10, Tube 16, faux 10. lip 18 × 16, 11 broad at the base, the tube here thus proportionally longer that than in the former; staminodes 14 × 10, 10 long inside, 13 long outside, filament 3 × 3.5; stylodes 6.

Distribution and vernacular names: The species here described is cultivated throughout Java and is found spontaneous in the teak forests (Randublatung, Kediri and probably elsewhere). BACKER collected it growing spontaneous near Batavia (no No), and at Lengkong, 600 M. on grassy lawns, BACKER 17092; while some specimens collected ad Tjitjurug, 325 M., among alang-alang (BACKER 17247) most probably represent the same species. According to BLUME it is very common in West-Java.

The first rather good description, has been given by ROXB. (1820, 20) who called it *Curcuma Zerumbet.* But ROSCOE (1828 t. 109) changed this name into *C. Zedoaria* on the base that this is the plant producing the drug "Zedoaria" of the Materia medica described by BERGHUIS (Materia medica 1788), and by WILLDENOW, to the name *Amomum Zedoaria,* while the drug Zerumbeth takes its origine from a species of Zingiber. The plant described by ROXBURGH (1820, 20 and 1798 t 201) and by ROSCOE (1828 t 109) must therefore be considered as representing the type of this species which following ROXBURGH and WALLICH was indigenous at Chittagong and in the eastern Himalaya.

The Javan species here described, and reduced by BLUME to ROXBURGH's species, agrees very well with the cited descriptions and drawings by the above named authors. Only the Javanese plants seem to be of a higher stature, for ROXBURGH mentions as the mean heigth only 2 or 3 feet, and ROSCOË 4 feet, wile the cultivated Java specimens attain 5 or 6 feet.

Outside Java the following regions are given by different authors as being inhabited by this species.

Ceylon, cultivated,: HERMANN (1578, 636) and TRIMEN (1898, 4, 241).

Malacca: RIDLEY (1899, 119 and 1907, 21). RIDLEY's description agrees as to the flower with the Java plant, especially the brown line along each side of the yellow bar of the labellum which is wanted in the type, but found also in most Batavian specimens, sometimes however quite absent. But apparently RIDLEY has confused this species with another one also very commonly cultivated in Java and identified here with *C. xanthorhiza,* ROXB. His description begins with: "Rhizome orange coloured inside" while, without a single exception, all authors call the rhizomes pale or bright yellow, as is also the case with our specimens, and he quotes the malay name *temu lawac* (*lawas*?) which is never given to this species but invariably to *C. xanthorhiza,* ROXB. Specimens of *temu lawac* kindly sent by the curator of the bot. gardens at Singapore and cultivated in the Bt. Gard. in Buitenzorg belong undoubtedly to *C. xanthorhiza,* ROXB., while a form of *C. Zedoaria,* ROXB. was sent with the name "*temu kuning*", not mentioned by RIDLEY.

Cochinchina, Annam: GAGNEPAIN (1908,67).

Amboina. There is no absolute certainty that RUMPH has known this species, but it is not improbable that he meant this species with his "*Temu putih*"; malay name still valid for this species in Java. ROXBURGH and most authors after him cite RUMPH VI t 68 for this species though this tabula shows a centralflowering species and undoubtedly represents either

C. domestica major, Rumph (*C. purpurascens*, Bl. or another species belonging to the same group). It is not quite impossible however that he mixed up different species in his description, for the description of the bulb, showing a high yellow central part and a white cortex does not apply to any other known Java species. At all means the species is not indigenous at Ambon.

Timor? A spike of a lateral flowering species in the Bzg. Herbarium, sent by de Castro, shows a great resemblance to *C. Zedoaria*, Roxb.; there is no indication whether it is spontaneous or cultivated. Also *C. porphyrotanica*, Schum. (see below) belongs probably here.

Celebes? A specimen collected by Koorders in Minahassa, 19671B., was determinated by Ridley as *C. Zedoaria*. If this specimen belong to a lateral flowering plant the determination may be right. But it is badly preserved and there is no trace of the inferior stem-scales. So it must hold a place among "Dubia".

Sumatra: Forbes l. c. discovered at Surulangan near Djambi in the lower forest in great abundance a species which he takes to be *C. Zedoaria*.

C. sumatrana, Miq. was reduced by Ridley to *C. Zedoaria* but he must have overlooked the fact, mentioned in the description, that the inflorescence is central.

Borneo: Specimens collected by miss Gibbs (no. 3956) on the Kinibalu at 1000 M. were reduced by Ridley to *C. Zedoaria* (Ridl. in Gibbs, 1914).

Curcuma xanthorhiza, Roxb. (1820) I. 25.— *C. Zedoaria*, Ridl. (1899), 119 et (1907), 21, ex parte. — *C. species, temu lawak*, v. Zijp in Kruidk. Arch. 14, (1917), 127 c.t. 11.

Herba valida saepe bimetralis. Bulbus maximus saepe 100 mM. long et lat. Rhizomata pauca, vulgo brevia, crassissima, ramis paucis iis conformibus, dilute aurantiaca, apice alba, intus tota intense aurantiaca vel rubro-aurantiaca (151 — 156 vel 131). Partes juniores pallidiores (161 et 166). Tuberi filipenduli maximi tereti-fusiformes fibris 50 — 300 mm. longis valde carnoso-incrassatis suspensi, intus toti intense aurantiaci (156), vel rarius lutei (216); novelli albi.

Caulis compressus viridis. Folia primaria sessilia, cetera modice petiolata, oblongo-lanceolata acuta glaberrima carnoso-coriacea intense viridia, macula atropurpurea in utraque parte secus costam (medio viridem), pinnatiformi fere a basi inde usque ad apicem pertensa, suberecta, magna, suprema usque metralia, petiolis ultimis pedem longis. In foliis primariis costa ipsa supra rubra. Vagina lata glabra.

Ligula conspicua, lobis rectis 3 mm. latis in medio vaginae angulo obtusissimo contiguis.

Spica lateralis. Scapus brevis validis, ± 5 acutis vel subrotundatis, mucronatis, quarum summa (explicata lanceolata 145 × 35) spicam attingit.

Spica mediocris, lata (160—230 × 80—100), haud dense bracteata. Bursae bractearum parte libera breviores ($^{1}/_{3}$—$^{2}/_{5}$), apertura lata vix lateraliter compressa. Partes liberae late ellipticae acutae, erecto-patulae apice vix patentes, pallide virides rubro-marginatae ± 15 superiores paullum longiores, pro maxima parte rubro-violaceae, basi viridi-striatae.

Flores mediocres vix protrusi. Bracteolae tubum vix superantes. Calyx corollae tubo dimidio brevior. Corollae tubus elongatus ($^{2}/_{5}$ floris longitudinis aequans), ostio lato. Faux brevis late cupularis basi annulo setorum crasso instructa, basi haud attenuata. Labellum suborbiculare lobo mediano retuso vix prominente. Staminodia latissima, flabellato-plicata, obtusissima. Filamentum longius quam latum. Anthera crassa brevis, calcaribus validis thecis circiter aequilongis, connectivo dorso minute glanduloso puberulo.

In all its parts this species is distinguished by its colossal dimensions. A full-grown tuber is 100 × 80, but often still larger. From this the rhizomes issue in a small number, sometimes three above each other, long 80 × 35, with 6 internodia, 65 × 40 with four internodia, 35 × 30. From the underside a little number of thinner side-branches, which are upcurved and form new tubers. Internally all parts are dark-orange or orange-yellow (151—156), sometimes red-orange like the roots of *Daucus carota* (131). Young parts 161 and 166. The accessory roots, which issue in a great number from the whole tuber, are thick, fleshy (5—10 mm.) about a length of 60—70 mm., below they become filiform and form large fusiform pendulous tubers on distances from 50—300 mm. The length of these is 60 × 20—100 × 25. The roots and root-tubers (the latter about their entire section) are internally deep-orange when old. The young ones however at first milkwhite, afterwards lemon-yellow.

A well-growing plant attains a heigth of 2 meter.

In a plant, which had nearly attained its full growth and about three months old, the spurious stem was to the youngest sheaths 750 high and 60 broad (much compressed). The plant had 8 leaves, of which only one had fallen off. The dimensions of these were:

380 × 145 + 0	P = 2.6.
650 × 240 + 40	P = 2.7.
710 × 250 + 80	P = 2.8. (rather more than.)
700 × 260 + 110	P = 2.7.
820 × 280 + 190	P = 3. (nearly)
980 × 235 + 230	P = 4.1 (rather more than.)
900 × 215 + 320	P = 4.2 (nearly.)

The leaves are thus rather narrowly oblong-elliptical, the greatest breadth was in the middle, gradually acuminate with short cusp, passing over the base without a line of demarcation into the short broad canaliculate petiole. The line between the blade and the petiole above is indifferently taken on a breadth of 30 mm., that is also the breadth of the base of the first sessile leaf.

The leaves are firm of structure, and they stand erecto-patent, somewhat nutant. The colour is saturate green with a dark-purple feather-shaped stripe about 10 mm. broad (including the rib) on both sides of the midrib, which does not reach to the base of the leaf, the canaliculate rib is green in the middle. In the older and, oldest leaves the hollow rib is on the contrary red-brown and the spot on the parenchyma is still wanting. The ligule is in the first leaves a straight band 1 mm. broad. In the higher leaves it is as usually V-shaped but both the branches, forming a very blunt curve, are straight, only at the edge they pass with a bow-shaped line into the sheath-edge, being 3 mm. broad about the whole length and coarsely ciliate.

The scape mostly arises at the end of the dry monsoon from a small tuber often at the top of a rhizome, from which also a new plant produces laterally, whose base forms a new primary tuber, it varies in length from 150—220 mm.

The inflorescence of a measured specimen (Hort. bog. 67: 9 = 42 H) is 220 mm. long and without the scales 8 mm. thick, glabrous, the spike only 180 mm. long (in other specimens 200—250). The scape is provided with 5 large scales, which are narrowed towards the top, blunt, and end in a mucro, which is sometimes to 15 mm. long. The innermost is (when flattened) ovate-lanceolate (145 × 35), and somewhat longer than the highest internode. Often the highest peduncular leaf is pouch-shaped-adnate to the stem, almost 100 × 30, when flattened, without a mucro and placed at distances of 40—50 mm. under the spike; in that case the last but one sheath has an ovate-lanceolate top, which ends in a mucro. The lowest bracts are nearly always all flower-bearing; the three lowest placed rather far from each other, forming a pseudo-cycle and they are somewhat larger than the higher ones.

The spike is 160—250 mm. long and nearly 100 mm. broad at the top. The bracts of which in one measured specimen are 35 in 5 more or less spirally twisted parastichies around the axis, differ but a little from each other in size and their transition is very gradual. The lowest are broadly elliptical with an acute top; deeply canaliculately upcurved for about a $^1/_3$ to $^2/_5$ of the length, adnate with the edges to two bracts of the higher placed whorl and outwards obliquely spreading without a decurved top. They are average 50×20—32 long, the largest is 55 × 30, here about 20 mm. are adnate, when flattened the free portion is ovate-acute. Above the 20th their shape becomes distinctly narrower and they pass into the coma-bracts. These attain here only 55—60 mm. by a breadth of 26—30, their connexion with the bracts above them, diminishes to $^1/_5$ or $^1/_6$ of the length, they are oblong-elliptical with an acute top, which ends in a mucro and which is somewhat recurved, being themselves less incurved and more spreading than the lower ones. They are very finely villose on the surface. The 4 highest are not fully developed, they are much narrower than the others and sterile. In a large inflorescence the coma-leaves attain 90×40, the bracteole 25. All coma-bracts are violet, between 551 and 576. The ovary is slightly hairy, 4 mm. long, the calyx 9 mm. long, colourless with 3 light red toothlets. The corolla is 40 mm. long, of which 20 mm. comes on the tube. The petals and faux are light-red, between 021 and 21. The lip is yellow, (241—246), the mid-lobule apparently entire, darker yellow (176); stamina whitish. The lowest light-green bracts are as long as the flower, 60—55, bluntly rounded with an acute top. They nearly protrude from the bract and the dark-yellow top of the lip is less protruding than in *C. purpurascens, Mangga* etc. The structure of the petals is firm. The flower is large and the tube 20—24 mm. long, and upwards not much dilated, but the in proportion short faux is abruptly campanulately enlarged above the mouth of the tube. The proportion of the tube-length to the border-length is 4 to 5, this being in *C. Zedoaria* nearly as 1 — 2. Particulars of the flower are still the broad thick ring of hair, the broad downward a little narrowed lip, (18×18) with broad side-lobes and a slightly protruding mid-lobe. The staminodes are broad (14×11) with a very flabelliform wrinkle in the middle, quite hidden in the short dorsal lobe, but slightly bent inward. The bracteole is somewhat longer than the tube (25 × 15). The anther is short and broad and has a thick outer side-wall of the loculi, the spurs are about as long as the loculi and not much spreading laterally. Under a good glass (8×10) it is to be seen that the whole dorsal side is covered with fine glandular hairs.

Distribution and native names.

The species described here under the name of *C. xanthorhiza,* Roxb. is cultivated throughout Java under the constant malay and Javanese name "*temoe lawak*", and in the Western-Java under the name "*koneng gedeh*".

As I have not seen an authentic specimen of Roxburgh and as his description includes only a few characteristics, the determination is not quite certain. The characteristics given by Roxburgh are: Lateral inflorescence, deep-yellow rhizomes and root-tubers (the latter is a fact that very seldom occurs and was considered as sufficient for determination by Roxburgh), a purple cloud on both sides along the whole midrib, and red petals. Schumann gives still some characteristics not occurring in the species, treated here, viz. the leaves should be shortly pubescent at the backside the bracts greenish-yellow and the coroll-lobes should have a red edge. This red edge of the petals however is a quite incorrect translation of the expression of Roxburgh's "outer border of the corolla red"; for, with "outer border". Roxburgh means, as is known in all his descriptions, the petals themselves, in distinction from "the inner border", i.e.=lip and staminodes. The petals are thus red in *C. xanthorhiza* Roxb, in the "*temu lawac*" they are light-red, this difference is but little. As to the short pubescence of the leaves, it is unknown how K. Schumann comes to this characteristic not mentioned by Roxburgh, it seems to me of little value.

The *temu-lawac* is spontaneous in Java in the teak forests. Specimens from Ngarengan (Rembang) and Tomo (West-Java) are cultivated here; they have not yet flowered but are unmistakeable by the dimensions, and colour of the rhizomes; They do not, however, always possess the peculiar taste and smell of the cultivated form.

There are also specimens from Mt Yang, 500 M. (Backer 9560) and from Mt Idjen by Koorders in the Herbarium, probably belonging here, but without notes sufficient for a certain determination.

Outside of Java this species is known from Malacca, where it is cultivated by the natives under the name "*temu lawas*" (Ridley l. c.) Specimens cultivated in the Bzg. Gardens from rhizomes received from Singapore with that name flowered here and proved identical with the Javan "*temu lawac.*"

The type specimen as mentioned above was collected by Roxburgh in Amboina yet apparently Rumph did not see it, for he certainly would have mentioned the orange coloured filipendulous tubers, which so highly struck the attention of Roxburgh. He mentions however the name "*temu lawas*" as given by the Balinese to the species called by him, not without doubt, *Tommon Zerumbet*, the description of which is very obscure (Rumph V. 169). The drawing added to this description and wrongly quoted by many authors as representing *C. Zedoaria* Roxb. belongs to a central flowering spec. (see above).

Curcuma aeruginosa Roxb. Roxburgh (1810) p. 335; (1820) I p. 27. Rosc. (1028) t. 106. Bl. (1827) p.— *C. caesia* Roxb. (l. c.) p.p. quoad spec. cit. Rumph. Amb. — *C. aeruginosa* Gagnepain (1908) p. 68. "Temoe item" Rumph V. 169.

Bulbus conoideus sat magnus, pleromate caesio vel subviridi-caesio (haud jure aeruginoso), colore versus apicem in viridem et albidum tendente cortice albido vel interne caesio. Rhizomata longa crassa leviter curvata vel s-formia nitide argillacea, internodiis elongatis, ramis parcis brevibus vel elongatis, medio crassioribus, plus minus falcatis, apice obtusis, intus eodem modo colorata. Tuberi filipenduli numerosi, fusiformes vel ovati crassi sat magni (45 × 23 — 100 × 20), fibris 10 — 200 mm. longis. Caulis validus valde compressus viridis, fere semimetralis. Folia breviter vel modice petiolata, magna, lamina semimetrali vel longiore, suberecta sat rigida oblongo-lanceolata, apice et basi sensim acuminata, fere 3 × longiora quam lata, primaria vix latiora, carnoso-membranacea intense viridia, inde a medio

usque ad prope apicem supra macula lata quasi pinniformi in utraque parte secus costam notata, parte inferiore semper tota viridi subtus concolore, glabra, vagina longa puberula, ligula fere stricta.

Scapus brevis vel usque pedalis raro semimetralis, vaginis paucis appressis rotundatis et mucronatis, superioribus binis vel summa tantum bracteiformis basi spicae adnata.

Spica vulgo laxiuscule bracteata bursis mediocribus vel brevibus convexis, bracteis puberulis vel glabris. Bracteae erecto-patulae, latae, omnes obtussimae vel rotundatae, inferiores rotundato-ovatae vel subobovatae parte libera bursa longiore, latiore quam longa, intermediae paullum longiores, superiores comam sistentes late ellipticae, vel summae steriles oblongae apice rotundato mucronulato, omnes valde induplicati canalem angustam versus apicem dilatatam sistentes.

Flores inter minores bracteas haud superantes, bracteolae parvae tubo corollae vix longiores. Calyx brevis apice subtruncatus, dentibus 3 subaequalibus brevissimis ($^1/_2$ mm.). Petala ovata cum fauce rubro-brunnea, obtusisima, dorsale valde cucullatum. Corollae tubus brevis, faux brevis, lata. Labellum subrotundum (14 × 15 — 17 × 17) parte mediano breviter bilobo vix prominente, vix unguiculatum sulfureum. Staminodia obovata apice rotundato-truncata, lateribus fere rectis filamentum brevissimum, aequilatum, anthera majuscula calcaribus mediocribus; stylodia longa.

Bulbs large, conical.

Rhizomes numerous elongate cylindric somewhat inflated in the middle (160 × 30), proceeding at all sides, 2 or 3 one above another, simple or composed of 2 or 3 members forming a sympodium, all as well as their branches (sessile tubers) which are few and long, growing as much as possible in a horizontal direction and faintly incurved, with blunt tips. Externally they are lead-coloured and polished, the tips white (if growing), tinged pink; internally the plerom of bulbs and rhizomes is blue, often with a faint greenish tinge, mostly sordid blue or even blue violet (447 and 467) under the buds, the cortex is white or the inner part blue (428 D, 453 D). The plerom of a young rhizome was between 396 and 0 396, the cortex almost white or also 353 D, a very diluted „verdigris."

The pendulous tubers are numerous and large, suspended by not very long (10 — 200) thick fibres; they are 100 × 20 or 45 × 25 long, ovate or fusiform, attenuated at both ends, the colour is pearlgrey with a white centre. The stem is (400 — 500) × (30 = 20). The petioles are 0—50—180 mm. The disks of four measured leaves were: 640 = 215, 600 × 180 (the inner), 550 × 175, 450 × 120. (P = 3).

Of an other plant of 7 leaves the dimensions were

Outer leaf 450 × 160 + 0. P. = 3.

660 × 200 + 150 P. = 2.86
600 × 215 + 120 P. = 2.8
700 × 220 + 135 P. = 3.
710 × 195 + 170 P. = 3.6
800 × 205 + 175 P. = 4.

The seventh leaf was not yet fully grown. The outer leaves are not wider than the mean leaves, which makes a difference with the mesantha, where they are always broader.

Inflorescence. The peduncle which appears apart in the beginning of the rainy monsoon may attain a length from 200 mm. to $^1/_2$ M. and is laxly enclosed with (mostly 2 or 3) close sheaths which are open on one side, rounded at the top and provided with a short and hard or sometimes long and weak point; sometimes this point is replaced by a small, rarely complete blade. The whole peduncle is 8 mm. thick. The spike is 140—180 mm. long by 60—80.

The bracts are weak-leathery, the lowest almost glabrous the coma-bracts covered with very short fine hair. All flower-bearing from the very base. Nearly always a bract-shaped adnate sheath is placed under the spike at a little distance.

The whorls are rather distanced. The pouches are broad and not deep; the bracts are canaliculate and much constricted near the base, while they are dilated at the top, which gives them a *spatulathe* outline, characteristic for this species.

Explained they are almost orbicular or obovate, in front very blunt or rounded. The adnate portion is always shorter than the free one, very broad. The length of the free portion is in the lowest bracts almost equal to or somewhat smaller than the width, in the higher ones the length is somewhat greater.

Dimensions of one of the lowest bracts: L. = 56, pouch = 20, breadth (on the border ot the pouch) 37. In the 7th leaf of a parastichy: L 51, pouch = 30, breadth 26. In one of the largest comaleaves L. = 70, pouch 20; breadth = 25. In another 72, pouch 15, br. 23.

The coma-bracts *are provided with a mucro*, which is sometimes very short, hardly visible, and is wanting in the intermedial bracts.

The colour of the coma-bracts is red-violet 551, descending to 556 and 561. The top is somewhat darker 552. Downward lighter, partly violet- and green-striped. The 10 lowest bracts are light-dirty-green, sometimes nearly white, with a violet-dotted and striped top. The bracteoles are short, almost 22 mm. and very broad.

The flower is wholly enclosed in the bract, with a short bracteole, not much longer than the tube (17 mm.)

The flower is rather short and broad, of one of the largest flowers the dimensions were: Calyx 11 mm., cor. 45, lip 17 × 17, with many folds, near the base only 11 mm. broad, staminodes 14 × 8, filam. 3 × 3.5, faux 13 × 22 (explicated), tube 15. Anthera 6.5 mm., cells 4.5, spurs 4 mm. (protruded only 2 mm.), stylodes 5—5 mm. The colour of the rather leathery petals and faux and tube is dark pink-red, inner parts pale yellow (216) mid part of the lip deep yellow; (181) calyx white with red teeth, anthers white.

Distribution and native names. This species is cultivated throughout Java and is growing spontaneously in the mountainous regions at 500—750 M., in dry grassy fields and in the teak forests. Backer (9537) and Jeswiet collected it growing sociably of the more common and very nearly related *C. phaeocaulis* (see under); moreover Jeswiet met with it on the Tenger, the Ardjoena and the Slamat at the border of shrubbery and in grassy spots, also in planted teak-forests. Koorders collected it on mt Idjen at Situbondo, Res: Besuki at 400 M., flowering in November (Kds. 20658 B 20751 B) and in teak forets at Kedoengdjati (25298 B). He however, found the rhizomes filled with airholes, a statement rather incredible. Rumph makes mention of the malay name of this species "temu item", it seems to have been introduced in Ambon from Java.

Native name: invariably "temu item" mal, "temu ireng" jav; but the same name is given to *C. phaeocaulis* Val. (vide infra).

Outside of Java this species is known from the following places:

Malacca: Some rhizomes where kindly sent by the curator of the Bot. Gardens at Singapore, cultivated by the malays as "*Temu itam*". They flowered and proved identical with the Java specimens.

Burma: Here the type specimen was collected.

Cochinchine: cultivated in gardens, Gagnepain (1908, 68), *Cambodge:* spontaneous.

The description of this species by Gagnepain agrees rather well with mine, only the sessile leaves and the red cloud stretching along the midrib mentioned by him are only to be found in young plants. In adult plants the cloud never reaches below the middle of the leaf, and the leaves have mediocre petioles, as also described by Roxburgh.

The determination of the here described species as *C. aeruginosa* Roxb is quite certain. As well the description of Roxburgh as the picture of Roscoe quite agree with it. The purple cloud in the center of the leaves ceasing abruptly below the middle is a very good characteristic.

But the verdigris-colour of the rhizomes on which the name is based occurs in the Javanese plants only in young rhizomes. The old rhizomes and bulbs are deep indigo-blue.

Roxburgh reduces Rumph's "temu itam" which is manifestly the same as our Javanese plant, to a Bengalese species, *Curcuma caesia* Roxb. But this reduction is contrary to his description of the species.

Curcuma phaeocaulis Val. n. sp. — Comp. *C. amarissima* Rosc. Monandrous Plants t. 101.

Bulbus conoideus, pleroma pallide caesium sub gemmis ad violaceum tendens apice in pallide flavum transeuns, cortice albido; vel etiam viridiflavum cortice caeruleo; rhizoma elongatum crassum teres leviter curvatum apice attenuato-obtuso annulis latis, plumbeum, nittidulum; pleroma piope bulbum pallide viridicaesium vel etiam viridi-flavum, cortice tota sordide albo, ceterum totum pallide flavidum.

Caulis et vaginae foliorum pulchre rubrofusca quasi polita, puberula, habitu *C. xanthorhizae* et *C. aeruginosae.*

Folia elliptica maxima suberecta basi et apice acuta, juvenilia fere a basi, adulta a media usque versus apicem macula intense atro-purpurea vel obscure purpurea ad costam mediam notata, versus basin sensim angustiore et delitescente, consistentia valida, intense virridia.

Scapus semipedalis vel pedalis, vagina summa bractei-formis, ovata, obtusa mucronata apice pallide purpurea basin spicae involucrans. Bractea fertilis externa ceteris parum longior, cum bursa brevi paullum convexa, parte libera apice rotundata marginibus leviter incurvis, Bracteae inferiores fere ad medium adnatae, parte libera obovata, breviora quam lata apice rotundata, acuta, br. intermediae (pleraeque) parte libera oblongo-ovata acuta et mucronata valde convexae. Bracteae comae ± 7 steriles anguste oblongae apice obtusae vel subacutae insigniter mucronatae.

Bracteae pallide virides apice purpureo-maculatae. Bracteae comae fere totae albae, apice macula purpurea coloratae.

Bracteolae maximae, tubum corollae valde superantes. Calyx magnus dorso breviter fissus, subtruncato 3-dentatus. Corollae tubus brevis ostio lato, faux lata. Stamdia latissima obovata ovato-obtusa. Filam, brevissimum, anthera magna calcaribus elongatis curvulis haud patulis. Stylodia 3 a 4 mm. Corolla inde ab ovario ad apicem labelli 45 mm. longa.

Bulb 70 × 40. Rhizome elongate, with long internodes and rare branches but litle curved, fleshy, the top obtuse, outside lead coloured quasi polished, the colour of the internal parts varies between blue, greenish yellow, white and pink. A young and vigorous bulb has mostly a blue pleroma (403 C et D) and a whitish cortex tinged with pink (462) near the upper end is yellowish-white; but sometimes the pleroma is greenish-yellow (287) and the cortex blue (442). The adult rhizome is blue intermally only near its issue from the rhizome and yellow for the most part, but young branches are often more or less blue intermally.

The stem is dark brown (78 et 83), as for the rest quite resembling *C. aeruginosa* and the sheaths finely puberulous just as there.

The leaves are very long, first elliptic, afterwards oblong lanceolate having a cloud along the midrib resembling that of *C. aeruginosa*, but

different as to the length, for it is 20-30mm. broad at the midst and extends in the adult leaves as a narrow strap along the midrib till near the base, while in the former species it always ends abruptly beneath the middle. Here as in the other species having purple stained leaves the cloud diminishes and obliterates at the end of the rainy season and in infavorable circumstances. The scape and spike are as in *C. aeruginosa* but the shape and colouring of the bracts is somehat different; the coma bracts are longer and narrower (f. e. 80 × 30) and much more acute than in *C. aeruginosa* where they have a rounded mucronate top. Further the coma bracts are white at the lower half and redpurple coloured at the top. The flowering bracts are circ 50 mm long, (The free part elliptic acute 30 × 16). Intermedial bracts 65, free part oblong ovate, 45 × 23; in an other flower 55, freepart 40 × 25. The bractlets are rather long, longer than the corolla-tube (30 × 20). The flowers are longer, 40-50, and differ from the former by the longer faux (14 × 25) and especially by the staminodes which are obovate elliptic longer and broader than in the former and obtuse not truncate.

They are 13-15,5 in the midst, only 10 mm long at the innerside Fil. 4x4. The anther has rather long curved spurs, which differ obviously from the short straight spurs of the former. The petals are red, the entire labellum deep yellow.

Distribution and native names:

This species is common in Java, cultivated and spontaneous. It belongs to the habitual flora of the teak forests and was found on the mt Yang by Jeswiet and Backer at 500 M. The native name is "*Temu itam*" juist as that of *C. aeruginosa*, but from Tomo (Soemedang, Western Java) it was sent by the name "*temu santen*", while the name "*temu itam*" was reserved by the expert natives for *C. aeruginosa* Roxb. A specimen collected by Backer (17628) at Tjiletoek at 100 m. belongs probably to this specis. If comparing the descriptions given here there will be litle doubt that the two species though nearly allied are different in details in all parts. Both belong to a group of species described by Roxburgh and Roscoe, having in common the presence of a blue colour in the rhizomes, a red coma and yellow flowers with dark rose somewhat coriaceous petals. These are *C. caesia, C. aeruginosa, C. amarissima, C. phaeocaulis* and probably also *C. ferruginea*. The latter is not mentioned in the description as having blue coloured rhizomes; but in Roscoe's picture the pleroma is distinctly blue tinged, and the flowers resemble very much those of the other species here named.

These species may be distinguished bij the following survey:

C. aeruginosa Roxb. Stem green. Bulbs and rhizomes internally blue or blue greenish tinged or aeruginous. Adult leaves with a broad dark or pale purple cloud along the midrib above the middle, green below the middle. Coma bracts purple almost to the base. Habitat: Burma and Malaya, Java:

C. *caesia* Roxb. Stem green. Bulbs and rhizomes internally light blue. Purple cloud on the leaves running down the whole length of the midrib. Coma deep bright red. Habitat: Bengal.

C. *amarissima* Rosc. Stem brown. Bulbs and rhizomes with a yellow pleroma and a blue cortex. Leaves entirely green. Coma bracts white with red tops. Habitat: sent from Serampore to Liverpool.

C. *ferruginea* Roxb. Stem ferrugineous. Rhizome internally pale yellow (with a bluish cortex?) Leaves with a pale ferruginous cloud on either side of the midrib only about the middle. Coma-bracts very acute, crimson and white. Habitat: Bengal.

C. *phaeocaulis* Val. Stem dark purple brown. Rhizome internally yellow and pale blue or greenish. Leaves with a dark purple cloud stretching almost to the base, but very narrow in the lower half of the leaf. Comabracts acute, white with crimson tops. Habitat: Java.

Curcuma Lörzingü Val. nov. sp.

Herba robusta sesquimetralis. Rhizoma crassum, elongatum, intus sordide citrinum (211). Folia maxima, media petiolata, erecta, rigidiuscula, crasse membranacea lanceolato-oblonga (P = 3.5), supra intense viridia, subtus glaucescentia.

Inflorescentia lateralis, ad semimetralis. Pedunculus glaber squamis paucis (nunc una basilari una pedunculari) elongatis vestitus. Squama peduncularis dum explanata lanceolata (140 × 30) acutissima membranacea basin apice attingens.

Spica longa, densa, bracteis infimis ceteris sat aequalibus florigeris. Bracteae florentes densae, parte libera late ovata obtusissima rotundata vel subtruncato-rotundata, plerumque multo latiore quam longa et *bursa multo breviore vel aequali*, pallide virides, glabrae. Bracteae comae subobovato-oblongae obtusae summo apice haud mucronatae. Bracteolae tubum superantes, carinatae. Flores (an normales?) inter minores, iis C. *Manggae* non absimiles sed minores, haud emergentes. Calyx parvus truncatus; petala ovato-oblonga obtusa. Labellum obovatum, lobulus medianus productus brevis latus, lobi laterales lati valde incurvi. Staminodia oblonga, basi paullum attenuata valde obliqua apice oblique rotundata. Filamentum angustum longius quam latum, anthera angusta, lingula brevissima, calcaria stricta, parallela, thecis duplo breviora, antice productione thecarum sulcata non pollinifera. Stylodia nune parva.

The description is taken from two spikes preserved in alcohol. Leaves are only known from young sterile specimens growing in the Bot. G., very large and erect, of a thick, rigid structure like those of C. *xanthoriza*, only entirely dark green above, kind of pale seegreen (cod. 341 — 346) below. A measured leaf attained 700 × 200 + 150. Flowers, in the examined spikes perhaps prematurely opened, only 38 mm. long, cal. 7, covr. tube 9, faux 9-10 × 21. Petals 13 × 9 and 12 × 10. Staminodes 12 × 7.

Lip obovate with a narrow claw and a broad somewhat protruding midlobe, sidelobes very broad upcurved; 16 × 15 (with the claw), length of the labellum with the faux 24. Filament 4 × 2, anther 4 mm. long with 2 mm long straight spurs grooved distinctly on the face by a prolongation of the thecae as in *Paracurcuma.*

"Flowerbracts bright green, coma bracts purple. Petals pink, labellum bright yellow".

West Sumatra, garden of Sibulangit in grassy and shrubby wastes on fertile ground. (LÖRZING 1248, 20 th Feb. 16).

This species has a striking resemblance to *C. sumatrana* Miq. by the broad very obtuse, or even truncate or subretuse bracts which in the lower portion of the spike are adnate far more than halfway, like those of *C. petiolata*. MIQUEL however describes the spike of *C. sumatrana* as central while, trusting LÖRZING, here the spike is lateral.

Among the lateral species, this species comes nearest to *C. Mangga*, which has also rounded flowerbracts, and the flowers and anthers are very similar; but the separated protruding midlobe of the labellum of C. mangga is wanting here, the antherspurs are not furrowed in *C. mangga*, the staminodes more plicate etc: By the rigid, fleshy structure of the leaves it is only to compare with *C. xanthorhiza*, and by the pale seegreen colour of the leaves below, it differs from all other species here described.

Curcuma petiolata Roxb. (1820) p. 36.— ROSCOE (1828) 100.— HOOK. f. in Bot. Mag. (1870) t. 5821.— BAKER (1894) p. 217.— K. SCHUMANN (1904) p. 102.— *Curcuma agrestis* sive *sylvestris* RUMPH (1747) V 164.

Herba fere metralis. Bulbi mediocres (60 × 50) vulgo congregati. Rhizomata pauca brevia crassa horizontalia internodiis brevibus, ápice sursum geniculato-reflexa et statim bulbum novum formantia ramis primariis et secundariis paucis irregularibus, omnibus gemma acuta incurva terminatis et gemma ultima sequentis ordinis eodem tempore cum gemma terminali evoluta, quasi bifurcationem sistente. Omnia extus pallide sordide flava, intus dilutissime flava. Gustu amaro.

Tuberi filipenduli forma sat diversi, partim oblongofusiformes basi in radices attenuati, partim parvi fere orbiculares haud longe stipitati. Omnes intus albido-grisei.

Folia dimorpha, caudato-acuminata, omnia concoloria viridia, supra secus venas minute appresse puberula, patentia. In herba luxuriante florente omnia late rotundato-ovata vel subcordata, maxima, latissima, omnia breviter petiolata. In herbis serius florentibus, altioribus, folia sensim longius petiolata et basi minus rotundata, summa (interiora), sub inflorescentia, lamina oblongo-ovata basi attenuata subacuta sensim in petiolum longum decurrentia. P. in fol. inferioribus 1.5—2, in superioribus 2.7.

Ligulae lobi rotundati, hirti, cum margine vaginae exsertae auriculatim prominentes.

Inflorescentia centralis, pedunculo paullum supra foliorum vaginas excedente, internodio superiore longitudine valde varia.

Folium pedunculare forma valde varium. Bracteae a basi inde florigerae, nunc laxae sat remotae (in stirpe pauperi), nune numerosissimae (80), densissimae, ommes angustae, puberulae apice rotundatae, inferiores ultra medium adnatae, pleraeque vix ad medium usque, parte libera canaliformi valde constricta apice patula.

Comae bracteae paucis summis exceptis fere ad dimidium adnatae.

Bracteae omnes intense purpureae, pro parte inferiore magis minusve viridi-mixtae, infimae apice tantum pallide-rubrae.

Bracteolae parvae. Flores graciles fere inclusi vel apice emergentes. Faux infundibularis, tubus mediocris apice vix dilatatus, labellum rhombiforme apice emarginatum, Staminodia elliptica obtusa, plana, vix plicata; petala oblongo-ovata, apice obtusa. Calyx brevis distincte obtuse dentatus vel truncatus, hirtellus. Antherae prope basin dorso affixae filamento brevi, angustae, brevi-calcaratae, puberulae, calcaribus sulcatis.

Flores lutei, labellum aurantiacum; petala tenuia apice pallide rosea vel albida. Calyx apice roseus.

The bulb is of mediocre size. It is often obconical (60 × 35) and hung all around with the short rhizomes consisting of 4 or 5 circles and curving upward at a length of 30 mm., forming new bulbs. Older bulbs are mostly conical or bulbiform but very often they are falcate in the middle in consequence of their origin from curved rhizomes. The secundary rhizomes are few and short, often it is only the last bud which developes making with the terminal bud a kind of dichotomous top. Characteristic for this species are rather thin (5 mm.) creeping stolones which form small bulbs at their top. The tallest rhizomes I saw were 60 — 70 × 20; mostly they are shorter and the bulbs are assembled in groups.

The colour is light sallow-yellow externally. The scales soon decay and fall off. The colour on the section is very light yellow (221—216). The taste is bitter and aromatic reminding ginger. The roots are cordshaped, often fleshy and thick near the base. Pendulous tubers are very numerous in old specimens. They often show two shapes, elliptical-fusiform to 70 × 20 long, which pass again downwards in roots and small ones as hazelnuts and pigeon's eggs. On the section thay are snow-white with a very light-yellow endodermis. The contents are viscous as lime. They hang on cord-roots which are 100 — 150 m.m. long. As well WALLICH as RUMPH mention the hazelnut-shaped tubers.

The leaves are dimorphous. All the leaves of a first-flowering strong plant of a rhizome are very broadly rotundate-ovate with a rounded or truncate base, and short-stalked, the outer ones 300 × 180 + 75 the inner ones 50 + 250 + 200. In another plant with 7 leaves the stem-forming sheaths were 280 mm. long; three measured leaves were respectively 300 × 280 + 150, 480 × 275 + 200, 450 × 270 + 100, thus P. = 1.5; I also found 400 × 240 + 100 + 200; 300 × 195 + 50 + 170; 360 × 210 + 60 + 190.

In other plants with exception of the first-formed leaves which are broadly elliptical, the leaves are rather long-petioled elliptical-lanceolate with a rounded outer-edge and an obliquely acute base, the oldest leaf 500 × 260 the youngest 500 × 115; the largest measured leaf 650 × 300.

The ligula is chiefly similar to that of *C. aurantiaca*, but both the lobes, which form lateral auricles at the base of the petiole, are here smaller (not longer than 3 mm.)

Inflorescence: Peduncle nearly quite enclosed by the sheath of the last leaf, arising from 0—80 mm. above the sheath, 150 mm. or more long, entirely finely pubescent; peduncle thin (in sicco 3 mm.) always provided with one peduncIar leaf, which now is brought approximate to the lower side of the inflorescence and now nearly forming a part of the inflorescence, but mostly it is placed under this from 25 to 100 mm. and accordingly it has a length from 35—190 mm. It is ovate or lanceolate, but both the edges are quite adnate to the peduncle, or when it is long, to the half, but seldom is quite open; always it leaves the opposite side of the pedunele free so as to form a wide obconical pouch, similar to that of the floral bracts, the peduncle has no nodose thickening at the base and a ligula is wanting. The highest normal leaf of the stem is always provided with an open sheath which ends at the top in a hairy bilobate ligula.

Towards the top of the inflorescence the pouches become proportionally shorter, the bracts more acute und more oblong. Central bracts of a large spike: 50 mm. long, 22—25 broad, more than the half free. One of the central leaves of the coma is 60 × 24, of which 50 are free, the top is acutely bow-shaped, without a mucro, only when seen under the lens, a projecting point. All bracts are especially at the edge and at the top more or less hairy. The peduncle is quite hairy. Of a poor spike the following dimensions: Peduncular leaf (when flattened) 50 mm. adnate portion 30 m.m., the free spreading top is ovate, 20 mm. long and when planed 35 broad. Lowest floral bracts 16 (free portion) + 30 (pouch) × 18; 15 + 20 × 20; further 23 + 20 × 20; 25 + 20 × 20; above the middle. Coma-leaves 25 + 25 × 17; 40 + 10 × 16. The flowers sometimes do not protrude far out of the bracts, the lowest from the short bracts, however, often nearly to the half. The colour of the coma-bracts is dark-red between 577, 570, 582 and 583, the tops ± 2. (red) lighter and greenish at the base. The others likewise all violet at the foremost part; lower in the inflorescence the colour becomes lighter and the striped light-green colour spreads; but to the lowest the tops are violet. The bracteoles are short, not more than 14 mm. long, ovate, concave, hairy, hyaline with a pink top. The flowers are slender, though the tube is short, to the hair-ring not more than 17 mm. but the faux is 15 mm. long and narrows downward. In a flower of rather more than 50 mm. the ovary was 3, the coroll tube 16, the faux and border to the top of the lip 32 mm. to the top of the staminodes but 28. The calyx is with the ovary somewhat shorter than the bracteole, with very short blunt teeth, quite hairy, the stylodia rather more than 5 mm. long. The lip is rhomboidal, downward narrowed and claw-shaped. The broad triangular, deeply cleft mid-lobe is much protruded and is a little recurved. Lip 15 × 15 to 17 × 17, claw ± 8 — 10 mm. broad. Staminodia proportionally long, broadest in the middle (inner edge 10, outer edge 15 mm. diameter 8 mm.), and hardly wrinkled. The filament (the free portion) is broadly ovate, 3 mm. long and as broad at the base. The anther is relatively small with a very short rounded lingule and short subulate or awl-shaped spurs, not longer than $^1/_4$ of the length of the anther, and with a groove on the face, see above p. 28 and Pl. III. The lateral petals are rotundate-ovate-oblong, white with a yellow or pink top, pellucid. The flower is for the rest very light-orange (161—166); the staminodes and lip-middle-band are somewhat darker (156).

The description was made from two living specimens cultivated in the Bot. garden and in the cultures of Mr. HEYNE both grown from rootstocks purchased at the "bazars" of Buitenzorg and Batavia. The two forms are not quite identical. One of them (H. Bog. 66.9) is to be distinguished from the other by the smaller elliptic leaves and the smaller and very lax almost glabrous spikes; while the construction of the flowers is almost identical; only here they are always smaller. The dimensions of the leaves of the smaller form were: 195 × 80 + 75, 280 × 140 + 70, 300 × 140 + 85, 200 × 135 + 80, 310 × 138 + 160 (Prop. 2. 1).

The description of both plants agrees sufficiently with ROXBURGH's description of *C. petiolata* and also with the picture given by ROSCOE. Only in the latter the colour of the bracts has a much bluer tinge (589-533) and the pouches seem to be relatively longer. The difference however between our plant and *C. petiolata* Roxb. is certainly of much less consequence than that between the latter and *C. petiolata* as pictured and described by HOOKER l.c., where the flowering bracts are adnate only to the middle, and the colour is rose-pink (551-556). As to *C. cordata* Wall (1830 t 10) = HOOKER (1849 t 4435), quoted as a synonym by BAKER l. c., and K. SCHUMANN l. c., I consider this as a distinct species, distinguished by the pubescence, and also by the form of the staminodes, which in both pictures seem to be rather profoundly furrowed.

Distribution: *C. petiolata* is cultivated in Java so far known only in Batavia and Buitenzorg and seems to be rare. Perhaps it occurs wild growing in the teak forests of central Java, but the rhizomes received with the same name "*temu puteri*" from the teak forests of Randu blatung, belong to a different species, see under *C. soloensis*.

Outside of Java. The type plant of this species was found in Pegu, the form described by HOOKER in Moulmayne. It is not mentioned as an inhabitant neither of Siam and Cochinchina, nor of Malacca.

This might be the species described by RUMPH as *Curcuma agrestis* sive *sylvestris* which he distinguished from the "*tommon*" (= temen) or "*kunjit*" by some characters seeming to agree with our species: "Folium subito a petiolo angustatum, quod illa tommon sensim faciunt. Radix in binos tresve tantum nodos est divisus, nullos distinctos exhibens digitos, externe ex cinereo colore flavescit, instar straminis, interne pallida est, cor gerens flavum, inodorum fere, saporem habeus amaricantem. Ipsius hypophytum altius et elegantius est ac faciilius progerminat quam in *Curcuma domestica*. Squamae superiores fuscae sunt interquas flavi eminent flores".

Here are certainly combined some characters which distinguish *C. petiolata* from *C. domestica* and *C. purpurascens*, but of course the conclusion is far from convincing and further investigations shall be wanted to ascertain the occurrence of this species in Ambon.

Native names: "*temu puteri*" in Batavia, and, if this is the *C. agrestis* meant by RUMPH: "Kuning utan" and, Kuning tommon" ("*koneng temen*" is at present the Sunda-name of *C. domestica*); Balinese "Tommon tihing" Javanese "tommon badur" (at present the name of the wild form of *C. Mangga*).

C. Aurantica v. Zijp **(1916, 340).**

Through the kindness of Mr. v. ZIJP I recieved of this interesting plant a tuber; which soon geminated and flowered in Jan. 1917. By the help of Mr. BEEKMAN, Director of the forest-experiment station, I recieved other specimens with living flowers from West-Central and East-Java. These give me just cause to some remarks.

Already at the first sight the plant has a quite other aspect than an Eucurcuma. The spurious stem, formed by the sheaths, is during the first flowering only 50—120 mm. high and the leaves are short-stalked, in one plant 30—80, in another one (from Ngarengan) 100—120; and spreading. The longest petioles which I measured in a fructiferous plant from Tomo were 230 mm.

The tubers are already described by Mr. V. Z, in contradiction to Eucurcuma they do not form rhizomes or very short ones, that form new tubers, which thus remain together in groops of sometimes 2, sometimes of 5—6.

The leaves which are very recognizable as well by the shape 190 × 100 to 260×150 (P= 1.7.) as by the shining dark-green (304—305) colour and leathery structure and constant form, were in one specimen 6, in another (from Getas) 8; in the latter the largest leaf was 350×180; the older one of about the same shape, the plant was nearly $^1/_2$ M. high.

The ligula is already sufficiently described, (see page 12).

The central inflorescence which protrudes far above the sheaths is cylindrical, the coma is not broader than the central portion. In one of the specimens from Getas the 10 comabracts are finely wine-red-striped in another one very light striped pink, the other bracts are varying in nearly colourless, yellowish and rather dark green with somewhat pink top; in the specimen of Mr. V. Z. the bracts were yellowish-green (218) the comabracts 578 D. The bracts are fleshy-leathery, with prominent reticulate veins, broad, with a very bluntly acuminate top at the broadly rounded upper edge. The pouches are longer than the free portions of the bracts, and much broader than the short gutters, formed by these, so that the bracts are far from each other; by bending outwards they seem to be still shorter. The number of the bracts in a vigorous plant was more than 64, placed in 8 parastichies.

Fruit. The specimens from West-Java bore many fruits; also in the teak-forest of Kepuh near Pasuruan Mr. BACKER collected fruits. These are obovate, 13×18 pilose, crowned by the calyx.

The flower has been described above, see Pl. III.

The fruits are obovate, 13×8, thinly hairy, crowned by the base of the decidious villous calyx. The pericarp is membranaceous and pellucid and shows the firstly ochre-yellow afterwards light-brown seeds enveloped by the whitish arillus, filling the loculaments. The thin pericarp bursts irregularly without valves and disappears, while the seeds are found free on the bottom of the pouches swimming in mucilage.

Distribution. This is by far the most common species of *Curcuma* of Java. It grows in the teak forests of all parts of Java, and flowers and fruits abundantly from November until the end of March. By the kind assistance of Mr. BEEKMAN, Director of the Forest-experimentstation I received specimens from Tomo, Tjabak, Randublatung, Ngarengan, Tritik (Kediri). Mr. BACKER collected it at Pelabuan-Ratu (Backer 864) and Tjisandawut (Backer 12164) in Pasoeroean (Kepuh, Backer 20960) and also in Madura, Bangkalan (Backer 18952) and Aroobaai (Backer 19251). Mr. VAN ZIJP, who was the first to describe it, collected it near Malang. Fruiting specimens from *Tomo* occur in the Herbarium (Kds 40880 B.) The plant is not cultivated on purpose, though the very young inflorescences are commonly used as vegetables bij the natives.

Native names: *"purot,"* certain name throughout Java, *"Kalamaseo"* sund in Tomo, West-Java; *"Blobo"* local name in Ngarengan.

Outside of Java the species has not yet been found.

In the icones ineditae of KUHL ET V. HASSELT there is a very good coloured drawing of this plant. Before I saw living specimens I had taken this for a badly coloured drawing of *C. petiolata*.

Incompletely known species.

Curcuma longa. Linn. sp. pl. 2 (1753); Rev. Lugd. Bat (1740) p. 12; Hort, zeyl. 77 (1747); Mat. med. 1749; — *Curcuma radice longa*, Hermann Hort. Ac. Lugd. Bat. (1687) P. 239. Cum tab.

Tab. nostra I.

The name is based only on HERMANN, who gives the following description: "Curcuma radice longa (Terra merita officinarum, radice crocea.)" The plant consists of a tuberculate terete rhizome, which is a finger thick and grows horizontally, consisting of many shoots and rings, gives birth from its buds to some thick fibers, massive, externally pale and rough, internally orange and gradually tending towards miniate, quasi formed of condensed orange coloured sap, of a bitter oderiferous sharp taste, of an aromatic scent. Light-green flat leaves, a span long and one or two palms wide arise from its buds terminating in a tolerably long point."

"From the young and valid tubers of this rhizome a scape is produced, which is three-fourth feet long, terete, juicy, as thick as a quill, pale-green, naked in its lower part, dilated from the middle to the top to a thick round spike consisting of leaflets which are at first pale-green, than yellow-reddish or pale-yellow, wide 2 nails, ending in a curved top, imbricate, containing in their hollow a tenacious and viscous fluid gathered from the dew of night. Moreover flowers arise successively from each scale, resembling somewhat Canna-flowers but three times smaller, composed of 4 mostly pale-yellow or purple-red leaflets, a hindmost one which is erect, two lateral ones outstanding and a middle one which is larger and ciliate." Etc.

In this description the rhizome agrees with the "*Curcuma domestica major*" of *Rumph.* by the deep-yellow clarly miniate color of the rhizome. The further description as well as the figure, however, indicates unquestionably a species with a lateral inflorscence, this is not a mistake, for on page 639 the author reverts again to this fact. The description should have been taken from a plant cultivated in the Hortus of Leyde. The separate flower on the engraving seems to have been copied from the figure of RHEEDE (Hort. mal. XI t. 11), published some years afterwards (see DRYANDER Trans. Linn. Soc. II, 1792, 212) and which represents *Gastrochilus panduratum* RIDL ; it resembles somewhat a dried flower of *Curcuma*. That HERMANN calls the flower "mostly yellow but sometimes purple-red", proves that the description is not taken from one single specimen (the purple-colour might suggest a flower of *G. panduratum*) and because HERMANN does not presume the existence of more than one species, it is also not quite sure that the described rhizome and flower belong to each other. By no means, however, DRYANDER has a right to declare that the figure given by HERMANN is erroneous, though it may not be the species which HERMANN indicates in the heading as the terra merita of the offices. For the species of LINNAEUS does not mean the latter but points to the description and figure of HERMANN. It is strange that TRIMEN (1898, 242) declares the figure of Hermann to be a good figure of *C. longa* cultivated in Ceylon. Perhaps he has overlooked this detail.

It seems to me that *C. aromatica* Salisb (*C. Zedoaria* Roxb;) (TRIMEN l.c. 241), the only one laterally flowering plant with a yellow rhizome, which occurs in Ceylon, must be the plant, which is by LINNAEUS at first called *C. longa* L.

Later, however, LINNAEUS has also added *Curcuma domestica* of RUMPH, (above described by me under a new name) as a synonym, in STICKMAN, Herb. Amb. (1754) 843, and in Amoen. Acad. 4 (1759) 129, and still later (spec. pl. ed. 2., 1762, 3) he adds also *Curcuma rotunda* (i.e. *Kaempferia pandurata* Roxb).

C. longa Linn. is therefore a very mixed species; but what is now the *Curcuma longa* of most recent authors, reclaimed to be the plant producing the deep yellow or orange rhizomes known as "Turmeric" and being a widely spread article of commerce?

ROXBURGH in dealing with *C. longa* takes as such the species described by KOENIG in Retz., Obs. (1738,3,72) and says:

"KOENIG's description is so very exact and complete, that there is nothing left for me to add." This is unfortunately a mistake for, exact KOENIG's description may be, it fits two species ,viz *C. viridiflora* Roxb. and *C. longa* Roxb.; and when we accept that the first may be excluded as being not malaccan, then ROXBURGH himself caused again a grave confusion, followed by the later authors (also SCHMUANN) in mentioning JACQUJN (1776,3, t. 4) which represents a species with a purple-red coma while KOENIG 's description as well as that of RUMPH. means a species with a white coma.

Perhaps he does so on authority of DRYANDER (1792,212) who has examined flowers kept in spiritus, sent to him by KOENIG, which he declared to be identical with the figure of JACQUIN. Such a comparison, of course, can only state that the examined plants belong to the same genus, but nothing is said about the species. The figure of JACQUIN and KOENIG's description represent undoubtedly two different species. The figure of JACQUIN and the one of LINDLEY in Bot. reg. t. 886, which seems to resemble the former are unfortunately not available to me.

However, it is clear that two species lay claim on the name of "turmeric." But very remarkably there is still a third species, which evidently was considered by HOOKER to be the "turmeric" and which does not belong to the species of KOENIG. This is "*Curcuma longa*" of BENTLEY et TRIMEN (1880,4.269).

Compared with *C. longa*, after the conception of KOENIG, as well the figure as the description differ clearly from this, because:

1st. The bracts of the coma and often the floral bracts are partly violet-coloured.

2d. The bracteoles are very small.

3d. The staminodia are large flat and 2-lobed at the top and not furrowed in the middle, and 4th the flowers are deep-yellow. According to KOENIG: the bracts of the coma are white, the bracteoles (involucrum exterius) as long as the tube, the staminodia with a longitudinal groove on the back and an incurved top (a characteristic of all Eucurcuma-species, observed by KOENIG), the flowers with a yellow middle-stripe of the lip.

But moreover the figure of the anther proves that the connective has a terminal concave prolongation in which the stigma is enclosed (a character, generally wanting in *Eucurcuma* species) and very short spurs and the staminodia are straight and arise above the not hooded dorsal petal. Finally also the orange-coloured rhizome which is a characteristic of *C. longa* auct, seems to be quite wanting.

Apparently we have here a still undescribed species nearly related to *C. petiolata*.

Besides the original species of LINNAEUS there are thus three species which are published as the mother-plant of the "well known" Turmeric, viz. *C. longa* Koenig, *C. longa* Jacquin, *C. longa* Bentl. et Trimen.

Curcuma sumatrana Miq: (1862.615); K. Schum. (1904, 109.)

From an authentic specimen of DIEPENHORST in Herb. bog. (no 1327) it is evident that indeed, as mentioned by MIQUEL the petiole and the leaf-costa have a very fine and hardly noteworthy pubescence below.

The bracts are distinctly hairy. According to MIQUEL (who examined a good preserved specimen) the peduncle is central; this is not to be made out in the badly prepared specimen of the Herb, bog. The inflorescence in this Herbarium resembles that of *C. Zedoaria* (of which however, the bracts are glabrous), by the rounded, not mucronate bracts. Perhaps it is this specimen which induced RIDLEY (1899) to quote this species as a synonym of *C. Zedoaria*. On account of the central inflorescence and the shape of the bracts, however, I think that it is nearly allied to *C. petiolata*. By no means it belongs to *C. Zedoaria*.

C. prophyrotannica Zipp; SPANOGHE in Linnaea XV (1841, 479)— *C. prophyrotaenia* K. Sch. (1904, 114)

In the ample description of SCHUMANN in Pfanzenreich I do not find a single character by which this species could be distinguished from any other exanthous species as *C. Zedoaria*, *C. xanthorhiza* and *C. phaeocaulis*, all of which show the purple bar or cloud in the midst of the leaf, which, according to SCHUMANN, induced ZIPPELIUS to call it *C. porphyrotaenia* (purplebanded). SCHUMANN (1904, 335) suggests this to be the real orthography, spoiled by SPANOGHE. He thinks this to be a good species and mentions as a specific character the very narrow leaves, 200—350 × 60-85, (P = 3,1), and 430 × 80, (P = 5).

But these proportions are the same as those of *C. Zedoaria*, where they are smaller in young plants only. In *C. xanthoriza* P is 4, in *C. aeruginosa* 2.3-4.

Quite possibly therefore this Timor species belongs to one of the 4 above named ones, but to which can only be settled by new materials from Timor, or perhaps by a new examen of the type specimen in Leyden.

4 **Curcuma longi-spica** Val. n. sp., affinis *C. Zedoaria*, male cognita.

Exantha habitu *C. Zedoariae*. Folia desunt. Pedunculus minute puberulus, 150 mm. longus, basi squamis 4 sensim majoribus involucratus. Folia peduncularia duo. Externum basi insertum, foliaceum, vagina 200 mm. longa minutissime puberula, petiolo nullo, lamina lanceolata, 150-200 mm. longa, interdum paullum infra spicam insertum, subbracteiforme.

Spica elongata tenuis, 220 × 60, densissime bracteata. Bracteae florales numerosae rotundatae obtusissimae, bracteae comae ellipticae obtusae, emucronatae.

Hab: S. W. Nova Guinea prope Daedalin in sylva. BRANDERHORST 234.

This may be only a variety of *C. Zedoaria*, from which it is distinguished by the large number (40 or more) of bracts.

Gastrochilus Wall.

WALL. Pl, As rar. I (1829) 22, t 24 et 25. RIDLEY, in Journ, A.S.B, Str. br. (1899, 108); GAGNEPAIN (1808, 54); K. SCHUMANN 1904, 91. — *Scaphochlamys* BAKER (1894, 252). — *Boesenbergia* KUNTZE, apud SCHLECHTER in FEDDE Rep. 1913, 313.— *Kaempferia* auct. ex parte.

This genus was based by the author on two species, natives of Burma, very different in habit but much resembling one another by the structure of the flowers. RIDLEY extended its limits considerably by uniting with it a series of species hitherto ranging under *Kaempferia*, thereby modifying noticeably the diagnoses of these two genera.

K. SCHUMANN, however, in his monography (1904,91) did not accept RIDLEY'S views, because the generic character of *Gastrochilus* in the sense of RIDLEY did seem to him rather vague and obscure; and he could not find any exclusive characters by which the two genera might be distinguished unmistakeably. Indeed RIDLEY did not demonstrate his point of view in limiting the genera and does not give distinctive diagnoses of *Kaempferia* and *Gastrochilus* in his sense.

On the other hand SCHUMANN based his limitation of *Kaempferia* and *Gastrochilus* solely upon the presence or absence of an anthercrest, a character the uselessness of which he himself demonstrates in *Alpinia*. In the same time he accepts in *Kaempferia* two species wanting a crest (*K. Prainiana* Bak. and *K. campanulata* K. Sch) and in *Gastrochilus* one species with a distinct crest (*G. Curtisii* Bak.) So his system condemns itself.

In order to procure an opinion about the question, I examined specimens of several species of *Gastrochilus* in the sense of RIDLEY and of the following incontested *Kaempferia* spec: *K. galanga, K. rotunda, pulchra, K. angustifolia* and came to the conclusion that the latter ones form a very well limited group to which also belong *K. elegans, K. candida, K. Roscoeana K. secunda, K. atrovirens, K. fissa,* of which I saw the pictures, and some more.

To the contrary *G. pandurata, G. Curtisii, G. grandifolium* (with many others posessing a crested connective) are all so similar in construction to the two typespecies of *Gastrochilus* Wall and so different from any true *Kaempferia*, that it is easy to define the genera *Kaempferia* and *Gastrochilus* in such a manner that two very natural genera are formed, without any consideration of the absence or presence of a crest.

The differential characteristics of these two genera will be shown by the following comparison.

Inflorescence:

Gastrochilus: Either a terminal *unilateral* elongate or abbreviate dense flowered spike enclosed by the leafsheath or an axillary very slender bilateral spike with a few distant mostly coloured bracts.

Kaempferia: a terminal head or fascicle, flowers spirally on the fleshy torus, involucrate by the exterior larger flowerbracts or by two larger special bracts.

Bracts:

Gastrochilus: Each flower enclosed by a bract and a bracteole resembling one another.

Kaempferia: Each flower accompanied by a bract and two smaller bracteoles connate at their base or almost over their whole length.

Flower:

Gastrochilus: Flower bilabiate ringent, corolla lobes connivent, dorsal lobe erect, anterior lobes patent.

Kaempferia: Flower often subcircular with a very small mouth, lobes elongate convolute patent.

Staminodes:

Gastrochilus: Staminodes shorter than the lip and often than the petals, sometimes very small, sometimes resembling the petals, in *G. plicata* very large obovate.

Kaempferia: Staminodes always large elliptic or oblong or obovate-oblong patent, similar to the labellum.

Labellum:

Gastrochilus: Labellum mostly entire, mostly oblong, much longer than the petals and staminodes, concave saccate or subsaccate or channeled at the lower part, the foremost portion patent or deflexed; in an other type widely obcuneate and emarginate at the top (*G. anomalum*, *G. cochinchinense*), rarely bifid with large lobes (*G. bilobum*, Ridl; *G. subbilobum*, Burkill).

Kaempferia. Labellum not longer than wide, bifid to the middle, lobes forming a cross with the staminodes.

Stamen:

Gastrochilus: filament rarely short (*G. grandifolium*) often as long as the anther, free, anther *exserted from the faux*, facing the lip; connective blunt (Eugastrochilus) or more or less crested; crest never larger and wider than the anther.

Kaempferia. Filament very short or wanting (*K. galanga* et *pulchra*). rarely elongate (*K. fissa*) inserted in the narrow upper part of the tube, anther *hidden within the corolla-mouth*, only the crest enserted and half-closing the mouth, crest as large or larger then the anther, petaloid, rarely small (*K. candida*).

Leaves:

Gastrochilus Petiole often long, sheaths terminated by two distinct often very much elongate auricles forming the ligula.

Kaempferia: Petiole (portion between blade and sheath) mostly short, ligula inconspicuous not or very obtusely auricled.

If the genus Gastrochilus be understood in this sense a new description is wanted:

Gastrochilus Wall. et Ridley; descriptio emendata.

Flores inter bracteolas 2 membraneas, aequilongas, interiore convoluta, inclusi. Calyx membranaceous spathaceo-tubulosus bracteolis brevior. Corollae tubus bracteolis longior vel subbrevior (*G. pulcherrima*) tenuis apice dilatatus, limbi petala conniventia, lanceolata, subaequalia, trinervia, dorsale, vel omnia, interdum cucullatum. Staminodia petaloidea, interdum parva, lanceolata, antheras vix superantia, vulgo petalis breviora et latiora, (raro permagna, petala superantia *G. plicatum*), Labellum magnum oblongum basi saepe cuneatounguiculatum et canaliculatum, hirsutum, integrum vel raro apice bifidum, petalis et staminodiis multo longius, saepe sinuato-crispum, deflexum, antice saepe leviter convexum, infra medium concavum, interdum saccatum. Stamen mediocre. Filamentum breve, (brevissimum in *G. grandifolium*) columnare vel elongatum et tum basi staminodiis adnatum. Anthera connectivo adnata articulatione nulla, *e fauce exserta*, thecis parallelis *nunc sutura antica, nunc poris terminalibus* dehiscentibus, margini connectivi adnatis, connectivo angusto vel latiore canaliculato apice mutico vel appendice brevi vulgo recurvo vel reflexo, nunquam antheram superante longitudine, terminato. Pollen non cohaerens, exine laevi, vel aculeato (*G. angustifolium*). Ovarium 3-loculare; pauci-vol multi-ovulatum. Ovula erecta. Capsula oblonga 3-loculare, valvis interdum (*Gastrochilus javanum*) carnosulis, dehiscentia revolutis. Semina arillo basilari laciniato instructa.

Rhizoma varium nunc tuberculatum nunc longe repens, tenue et stoloniferum; radices saepe tuberosi clavati vel capitati interdum omnes filiformes. Caulis raro elongatus, saepe brevis et vaginis foliorum inclusus.

Inflorescentia spicata centrifuga: *nunc terminalis*, secundiflora, rachi unilaterali, dorso nuda subcrassa elongata vel abbreviata, bracteis densis numerosis bifariis, singula florem bracteola involutum comitante, sessilis vel pedunculata; *nunc lateralis*, radicalis, nuda, vel axillaris et vagina folii subinclusa, rachi gracili brevi vel elongata, bracteis distantibus cymbiformibus vulgo paucis, flores singulos vel paucos bracteolis involutos includentibus: nunc, in singula specie, strobiliformis bracteis latissimis rotundatis imbricantibus.

There are now 45 or more species known of this genus and these may be ranged more or less naturally into groups by attending either to the structure of the flower, especially of the anther, or to that of the inflorescence; but it must be considered that the modifications in either of these characteristics do not run parallel. If the structure of the stamen is taken as a base there are principally three types to be distinguished.

1. Anthers straight, neither incurved nor recurved, cells parallel opening by splits, connective not or very little prolonged above the cells. Often but not always the labellum is more or less profoundly concave (saccate). To this group the two type species of the genus belong, *G. pulcherrimum* WALL and *G. longifolium* WALL. further *G. pulchellum* RIDL., *G. albosanguinea*, *G. pulcherrimum*, *G. rubroluteum*, *G. ochroleucum* (all of RIDLEY), *G. xiphostachyum*, *G. phyllostachyum*, *G. Thorellii* (of GAGNEPAIN), and probably many more: *G. Prainianum* Ridl., *G. anomalum* K. Sch, *G. plicata* RIDL. With a few exceptions these species have a saccate labellum, and the inflorescence is elongate, multiflorous and on the top of a leafbearing stem. This group might be called: *Eugastrochilus*.

2a. Anthers linear, a little recurved, cells parallel in the lower part, diverging near the top opening longitudinally. Connective projecting above the cells forming a short linear 3-dentate at last reflexed crest. Labellum oblong with a subsaccate lower portion and a deflexed upper half. Inflorescence central.

There is only one species described down here, the anther has this peculiar shape (G. *panduratum* Ridl.), but in *K. cochinchinensis* Gagn. 1908, 64, tab 3, 21-29, which evidently belongs to *Gastrochilus*, the anther is almost identical, but here the labellum is obcuneate not saccate, like that of *G. anomalum* K. Sch., and the inflorescence not dense. Probably here belongs also *G. vittatum* (N. E. Brown) Val. of which I could not examine a flower.

2b. Anthercells parallel, oblong, adnate to the sides of a fleshy hippocrepiform, more or less prolongate connective, opening by terminal pores.

Here belong *G. Curtisii*, BAKER, *G. grandifolium* Val., *G. javanum* K. Sch., *G. Lörzingii* Val., *G. apiculatum* Val., and probably *G. hirtum*, Ridley, *G. bractescens* Ridley and *G. striatum* Val. Though the structure of the anther is rather different in these two groups, still *G. javanum* with terminal pores and *G. panduratum* with longitudical splits are very nearly related and form together a natural group, in which the connective is projecting. To this combined group belong several species described by RIDLEY. It is distinguished from *Eugastrochilus* principally by the presence of the crest of the anther while the way of dehiscence of the cells is unknown in most species.

I propose to call this group: *Paragastrochilus*.

If the structure of the inflorescence is compared in the diverse species examined, two rather different types must be distinguished.

The first one is found in the first type of the genus and excellently described by WALLICH.

It is a "terminal spike", sessile (on the top of the leafstem) oblong, attenuate, acute, the base hidden in the upper sheaths, bearing flowers at the face side only, at the backside plane and imbricate by the erect, alternate, appressed, subdistant, one inch long, green, lanceolate bracts. Rachis thick fleshy, rather plane, in the middle of the backside denudate." (WALLICH l. c.)

This definition accords exactly with the inflorescence of *G. panduratum* There too the rachis is thick, fleshy, rather plane and denudate at the backside, but while this is elongate (125 mm. long) in *G. pulcherrimum*, the rachis is about 25 mm long here. Moreover the spike is long peduncled (see ROSCOE 1828 tab. 26), the peduncle is nude and consists of two internodes, the lower short, the uppermost rather long but varying according to the age of the bulb, it can reach 120 mm. The whole peduncle with the base of the inflorescence is enclosed by the imbricating very long sheaths of the 3 to 5 radical leaves and outside of these by several large scales or bladeless sheaths diminishing in size to the exterior. They are often brownish-red-coloured. Near the top of the peduncle is inserted the last normal leaf, and alternating and imbricating with it the outermost green bract of the inflorescence which sometimes has a small blade. Between these two sheaths the inflorescence is enclosed. This consists of the short fleshy conical rachis, varying in length from 15—30 mm. *nude at the backside*, bearing, if a young plant be considered its first flower immediately underneath the top, and the rachis terminated by 1 or 2 sterile, rudimentary bracts, the following flowers (10 or 12) developing from top to base, biseriate on the foreside of the rachis. Each flower is enveloped by two bracteoles, the interior convolute, both closely appressed.

In the most essential points the inflorescence of *G. pulcherrimum* and *G. panduratum* are identical, only differing in relative points. In *G. pulcherrimum* the foliate stem is elongate, the spike with its elongate rachis sessile, for the part exposed to the light and the bracts green. In *G. panduratum* the foliate stem is abbreviate (10—25 mm.) the rachis abbreviate also but elevated by a very long peduncle, enclosed in very large bracts and almost hidden from the light; the bracts here are very light green.

Comparing to these *G. plicatum* Ridl. we find again the same essential proprieties. Here the peduncle is elongate, enclosed by the leafsheaths as in *G. panduratum* but the inflorescence elongate and wholly exserted as in *G. pulcherrimum*. The leafblades to the bracts as described by RIDLEY are wanting in our specimen (BURKILL 1009).

The infl. of *G. grandifolium* is quite similar to that of *G. panduratum* only the axis is a litle longer and the flowers more numerous, but there is no peduncle and the central stem bears only one or two leaves. So the spike enclosed in the leafsheath is seemingly axillar, really terminal. The infl. of *G. apiculatum*, is likewise terminal sessile and unilateral, but the stem is erect and bears 8 leaves inserted on short (3-5 mm) distances, but it is quite enclosed by the long alternating and imbricating leafsheaths. To this group evidently belong *G. pulchellum* Ridl., *G. vittatum* (N. E. BROWN) Val., *G. cochinchinense* (Gagn.) Val.; further all those species enumerated under "*acranthi*" by RIDLEY and under *Gastrochilus* by *Gagnepain*, and probably several ones ranged under "*mesanthi*" by RIDLEY. It does however not coincide with the "*mesanthi*" of RIDLEY, some of which have a very different structure of the inflorescence and belong to the *secund section* I accept.

Of this the type is found in *G. Scaphochlamys* Ridl., described by BAKER as a proper genus: Scaphochlamys (name probably from the boatshaped bracts?) and placed near *Elettaria*.

Here the inflorescence is a composed spike consisting of a slender (erect? or procumbent) rachis rising directly from the creeping rhizome and acompanied by 1-3 leaves ("central in a tuft of leaves", RIDLEY), shortly peduncled and composed of ± 6 nodes (BAKER) (flexuous?), 125-200 mm long, bearing large lingulate, persistent bracts involute in the lower half, erecto-patent and enveloping several flowers.

With this description (which I gather from the adumbrations of BAKER and RIDLEY) perfectly agrees a not yet described species collected by

TEIJSMAN in *West-Borneo* and which I named *G. laxiflorum*. Here also the slender spike rises directly from the rhizome and is sheathed by a few leaves. The subcoriaceous cymbiform subpatent bracts are 30-35 mm long and distanced about 10-15 mm., the spike with its peduncle 150 mm. The bract envelopes 3-7 flowers. Each flower is semi-involute by a small bract (12 mm. long) and accompanied by two very small bracteoles. Comparing this with the infl. of *G. pulcherrimum* the difference in habit is so striking that only a strict comparison of the flower-structure shows the affinity of these species. Quite similar is the inflorescence of another species in the Herb. Bog., collected by BURKILL (Pahang, 1143) named *G. subbiloba*, not yet published. Here the spike is only 100 mm. long, flexuose and bears 4 cymbiform bracts distanced 5—8 mm., the peduncle is villous, the spike deglabrate. There are no flowers, only a glabrous young fruit enclosed by the top bract. There are only two radical leaves with long imbricating sheaths and embraced by a large sheathing scale. The spike is radical and enclosed by the leafsheaths.

To this group belongs also a rather different species: *G. angustifolium* HALLIER. Here the stem or ascending rhizome is thick, woody, erect, and bears several (± 10) alternating approximated sheathing and imbricate leaves, the spikes rise from the leafaxils and sometimes from the outer sheathing scales, the rachis is composed of 2 or 3 thin flattened internodes, 5—10 mm long and a rudimentary filiform top internode; it is flexuose (zigzag), and bears commonly two or three cymbiform, rather stiff brown coloured bracts, which each include only one flower enveloped by the thin membranous convolute bracteole.

The flower is very similar to that of *G. longiflorum* Wall, the saccate lip being adnate to the base of the stamen but the connective is projecting a litle above the cells, forming a minute 3-crenate appendage, visible to the nude eye, but so short that it was quite overlooked by HALLIER and that SCHUMANN ranges this species under Gastrochilus where it certainly belongs.

Beyond these four species which form what I would call the *scaphochlamys*-group, here must be ranged: *G. laxifoluis* Ridl., and *G. longipes* King and Prain; all belong to *Paragastrochilus*.

They all are conspicuous by the slender axis and rigid, cymbiform, distanced subpatent persistent bracts, by their origin from the leafaxils or directly from the rhizome, sometimes from the centrum of the leaves but never directly terminating a long or short leafbearing stem as was the case in the first treated of group.

G. longiflorum, the second type species of Eugastrochilus has a somewhat different inflorescence because of the more dense imbricating bracts; but the bracts are distanced with spiral not unilateral insertion, their consistence seems to be rather rigid, (though not expressly mentioned in the description) and each encloses one or two flowers enveloped by their proper thin bracteoles. So it may be combined with the *Scaphochlamys* group. Here also *G. Prainianum* Ridl, another *Eugastrochilus* with numerous imbricate bracts but with a slender spike arising directly from the rhizome *seems* to belong. Both these species are placed by RIDLEY among the "Mesanthi" as is also *G. Scaphochlamys*, together with *G. panduratum* and *G. curtisii* This group seems to me a very unnatural one.

As a third monotypical group here may be disposed *G. Kunstleri* (BAKER) Val, the flowers of which have much in common with the Gastrochilus type; while the inflorescence is different both from the pulcherrimum and from the scaphochlamys type. The structure of lip and stamen however, does not agree with any known species of Gastrochilus.

Taking the inflorescence as the chief principle and the anther structure as a secundary principle, I propose the following scheme of a subdivision of the genus.

Subgenus I Densiflorae: (= terminales.)
Sectio A. Nudae (Eugastrochilus.)
    Subsectio A Acranthae (e.g. *G. pulcherrimum* Wall.)
    Subsectio B. Hedianthae (e.g. *G. pulchellum* Ridl.)
Sectio B. Cristatae (Paragastrochilus.)
    Subsectio A. Rimosae (e.g. *G. panduratum, G. cochinchinense* (Gagn.) Val.
    Subsectio B. Porosae (e.g. *G. Curtisii, G. grandiflorum.*)
Subgenus II Scaphochlamydae
Sectio A. Nudae (Eugastrochilus.)
    Subsectio A. Exanthae (*G. longiflorum.*)
    Subsectio B. Mesanthae (*G. Prainianum.*)
Sectio B. Cristatae.
    Subsectio A. Axillares (*G. angustifolium.*)
        B. Radicales (*G. malaccanum = Scaphochlamys; G. laxiflorum.*)
Subgenus III Strobiliformes (e.g. *Gastrochilus Kunstleri* (BAKER) Val.)

According to SCHLECHTER (in FEDDE, Repertorium 1913) the name Gastrochilus Wall. (1829) cannot be maintained because it is ulterior to Gastrochilus Don (1825) an Orchidacea. The latter genus being considered at that time by all botanists to be a synonym of *Saccolabium*, Bl., the Wallichian genus was generally accepted as valid. (see Viennarules 1905 art 50).

Eighty four years post dato the well reputed Orchidologists RIDLEY, J.J. SMITH, SCHLECHTER having unanimously come to the conclusion that the rejection of the name Gastrochilus Don had been the consequence of an error, SCHLECHTER undertook to restore that genus to its titles by which restoration *Gastrochilus* Wallich became invalid as being a symonym. He thereby felt constrained to substitute *Gastrochilus* Wall. by *Boesenbergia*, a name formerly proposed by KUNTZE but not accepted. Accordingly the species of Gastrochilus known to SCHLECHTER, were rebaptised by him as *Boesenbergia* (in FEDDE, Repertorium 1913).

To my opinion the restoration of *Gastrochilus* Don might have been left out. A once rejected generic or specific name should not be restored in case that name was used during its period of non-validity to base a new genus or species upon. And if the youngest application of the name has been valid for 84 years as was the case with *Gastrochilus* Wall, it ought not to make room for a name, which never till now has been reognized as valid, though the first rejection of it was based on an error.

Instead of *Gastrochilus* Don another name with the same signification or an unsignificant metathesis of characters should have been applied in which case the renaming of several species would have been superfluous.

The following species have been found till now in the Malayan Archipel:

Java: *Gastrochilus panduratum* Ridl. 1889, 110. also in Bali, Sumatra, Malacca, Cochinchina and probably elsewhere cultivated. Probably a variety in Ceylon and India.

Java: *Gastrochilus javanum* K. Sch. endemic but perhaps too close allied to *G. Curtisii*, Bak, from Malacca. Tab nostra X.

Sumatra: *G. angustifolium* Hall. 1898, 358, Deli.
G. gracile Val n.sp. Bencoolen

Sumatra: *G. violaceum* Ridl. 1909, 56, Padang.

Sumatra *G. vittatum* (N.E. BROWN) Val. Gard. Chron. (1882) Loboe.
G. Lörzingii Val n.sp. Sibulangit.

Borneo: *G. hirtum* Ridl. 1909, 56, Sarawak.
G. bractescens Ridl. 1909, 56, Lundu.
G. pulchellum Ridl. 1906, 229, in Sarawak Bidi.
G. anomalum (Hall.) K.Sch (*G. Hallieri* Ridl. 1899, 109), Mt Liang Agang.
G. parvum Ridl. 1905 Sarawak, Bidi. (non vidi descr).
G. reticosum Ridl. 1905 Sarawak Bidi (non vidi descr).
G. ornatum (BROWN) Val. Ill. hort. 33 (1886),
G. pulcherrimum Wall. 1830, t.24 Also of Burmah and Penang.
G. brevilabrum Val n.sp.: Central Borneo.
G. grandifolium Val 1914 t.377 Central Borneo.
G. apiculatum Val Tab. nostra XI.
G. striatum Val Tab. nostra XII.
G. laxiflorum Val Tab. nostra XIII.

Key to the determination of Species.

A. Spike radical or axillary, elongate, slender, with distant cymbiform bracts involucrating one or more flowers. Anthercells dehiscing by splits.

- *a.* Spike radical much longer than petiole (± 130 mm.) Bracts enclosing 3 or more flowers. Leaves lanceolate long petioled. Anthercrest conspicuous: *G. laxiflorum.*
- *b.* Spike very short axillary. Bracts few, enclosing one flower; connective very little prolonged, blunt. Labellum saccate.
  - a¹. Leaves subsessile, very long linear lanceolated, spikes sometimes extraaxillary. *G. angustifolium.*
  - b¹. Leaves ovate-lanceolate, slender petioled, spikes in all the axils. *G. gracile.*
- *c.* Spike very short axillary, branched. Bracts 4 enclosing numerous flowers. Leaves petioled with long sheaths, lanceolate. Crest conspicuous. (non vidi.) *G. bractescens.*?

B. Spike terminal, flowers and bracts unilateral, secund, biseriate. Anthercells opening by splits or pores.

- *a.* Spike elongate on the top of a green foliate stem, Bracts green. Anthercells opening by longitudinal splits, no crest. Labellum saccate (Eugastrochilus). *G. pulcherrimum.*
- *b.* Spike more or less abbreviate, very dense flowered, ovate-fusiform, enclosed by one or two large sheaths, axis short broad, bracts white or very pale green; cells opening by splits or pores.
  - a¹. Spike from the center of a tuft of leaves.
    - a². Leaves radical or approximated on a very short stem, inflorescence long peduncled, peduncle nude with one or two leaves at the top, flowers rather large, lip panduriform or oblong, subsaccate, crest, of the anther short. Leaves long petioled, elliptic-oblong.
      - a³. Anthers dehiscing longitudinally, crest recurved or reflexed; staminodes obovate much shorter than labellum, flowers reddish pink. *G. panduratum.*
      - b³. Anthers dehiscing by pores. Crest very short, bidentate, a little curved. Staminodes oblong, flowers white, tinged yellow and red.
        - a⁴. Flowers rather large, labellum oblong cuneate much longer than the petals a little deflexed. Herb 2-5-foliate: *G. javanum.*
        - b⁴. Flowers much shorter, labellum rhomboid obcuneate. Herb 1-foliate, 2-foliate in variety B. *G. Lörzingii.*
      - c³. Anther cells opening longitudinally, no crest. *G. pulchella.*
    - b². Leaves alternate and distanced but with imbricating sheaths on an erect stem. Inflorescence sessile on the top, sheathed by the uppermost smaller leaf.

a³. Leaves several obovate-lanceolate subacuminate and very acutely apiculate glabrous, petioles rather long, anther cells opening by pores, crest short emarginate. *G. apiculatum.*

b³. Leaves two, oblanceolate, subobtuse mucronate, hairy, crest ovate. *G. hirtum.*

c³. Leaves narrow oblong-lanceolate obtuse, petiole short. Sheaths rather long and wide, densely sheathing and imbricating the stem, striate and shining (in sicco); crest rather large, 3-toothed. *G. striatum.*

d³. Leaves ovate, obtuse, short petioled. Bracteole long acuminate. Lip spathulate with e linear channeled claw, violet with a yellow bar. Anther without a crest. *G. violaceum.*

e³. Leaves long-petioled, lanceolate, silvery variegated, backside brown, spike pluriflorous; labellum roundelliptic, entire; crest suborbicular. Flowers yellow. *G. ornatum.*

f³. Leaves long-petioled elliptical, pinnatim-variegated Spike pluriflorous; labellum oblong, emarginate crest concave, with a revolute tip. *G. vittatum.*

b¹. One single (rarely two) radical leaf with broad and long sheath involucrating the dense subsessile spike.

a². Leaf very long, unto 500 mm. Infl. very dense flowered. Labellum cuneate not bilobed. *G. grandifolium.*

b². Leaf 125-150 mm. long. Spike small (1 inch), lip obovate, broad, bifid. *G. latilabrum.*

Gastrochilus panduratum (Roxb.) Ridl. 1899, 110, 114; 1907, 19,—. *Kaemferia pandurata* Roxb. As. Res. XI, 320 (non vidi); Fl. indica 1820; Bot. reg. 1916, 2 t 1731; Rosc. 1828, t 96 (an male depicta, an species diversa?); GAGNEPAIN 1908, 52; K. SCHUMANN 1904, 82 excl. deser. floris.— *Zerumbed claviculatum,* Rumph. V 172 t 89.

The description and drawing in the Botanical register, from a Sumatra specimen, agree perfectly well with our Java plant. The anther is here recurved and the appendix very small, it varies in the Java plant from $^1/_2$-3 mm, and is recurved or reflexed, the cells of the anther are linear, parallel only at their base, and much diverging from the middle upward. The staminodes are widely *obovate,* shorter and broader than the petals, and of a bright pink colour as well as the petals. In the figures of ROSCOE the appendix is almost as long as the cells, and the staminodes are *narrowly oblong* and *white.* Here is either represented a different species or the drawing is very incorrect. But TRIMEN, 1898, 243. also described the staminodes as oval-oblong. Probably, therefore, there exist two different forms.

Distribution: Java, Spontaneous (but not fruiting?) in the teak forests of Tomo (150 M), Tjabak (150 M). Randublatung, (KALSHOVEN, KOORDERS (several numero 's), Kediri (KALSHOVEN) No specimens seen from eastern Java. Cultivated in Buitenzorg and Batavia (HEYNE 3). Native names: Certain name throughout Java and Malacca: *Kuntji* and *Temu Kuntji putih* (Bzg), *Kuntji putih* (Kediri, HEYNE 58,) a var, with rather small flowers) *Kuntji kuning* (Kediri type, HEYNE 57,) *Kuntji kuning*, (Pamekassan, Madura, type, HEYNE 51).

Outside of Java: Sumatra: The type specimen (Roxb, Fl. ind 17) was collected in Sumatra, and the drawing in Bot. reg. was made up from a Sumatra specimen.

Malacca: Rhizome 's sent by the kindness of Mr. BURKILL and bearing the same malay name are identical with the Javanese type.

British India and Ceylon cultivated (BAKER)

Ambon, introduced from Java and Bali (RUMPH.)

Cochinchina (GAGNEPAIN)

Gastrochilus javanum K.Sch. 1904, 95 (*Gastroglottis* Zoll. 116.) Tab. nostra 10.

Herba habitu *Gastrochilus panduratum* prope accedens. Radices carnosi teretes ante apicem in tubera parva ellipsoidea incrassata. Pseudo-caulis brevis e vaginis paucis compositus.

Folia longe petiolata elliptica et oblonga apice breviter subacuminata vel apiculata valde acuta, basi obtusa vel acuta vel attenuata, in petiolum complicatum decurrentia, supra glabra, in sicco olivacea costa et venis albidis, subtus in sicco pallide grisea pilis parcis applicatis laxe conspersa. Vagina lata membranacea glabra, ligula conspicua biloba, lobis ovatis prominulis.

Spica pedunculata, inter vaginas latas foliorum binorum oppositorum, a foliis basalibus remotorum, altero lamina diminuta vel nulla instructo, inclusa, primo capitata, demum brevissime spicata, multiflora, dense compacta. Pedunculus pilosulus vaginis basalibus inclusus. Flores sessiles, nunc circ. 10—15, singuli bracteis binis subaequalibus instructi, lineari-lanceolatis, acutis, tenere membranaceis, interiore (bracteola) paullo latiore et convoluta. Calyx tubulosus, apice primo acute bidentatus demum scissus, bracteis multo brevior. Corollae tubus bracteis duplo longior, ad 10 mm., tenuis apice abrupte in limbum dilatatus.

Petala oblongo-lanceolata acuta, trinervia, dorsale apice vix cucullatum 20—23 mm. longum. Staminodia oblonga vel subobcuneata apice rotunda vel subtruncata 7—9 venia petalis paullum breviora et latiora 15 mm. × 4 – 7. Labellum staminodia multo superans obovatum 20 × 15, late unguiculatum, per anthesin valde patens, basi subconcavum, parte anteriore late apiculata deflexa margine undulato, et plicato-crispulo centro linea incrassata dense appresse sericella, infra medium pertensa. Faux brevis sericeus, ut pars superior tubi interna. Stamen breve, fauce subinclusum; filamentum brevissimum sericeum, in connectivum paullum latius concavum crassum apice appendice ovata crassa bidentata recurva instructum, sine articulatione transiens. Thecae lateribus connectivi antice adnatae, *oblongae apice poris rotundis* dehiscentes. Anthera leviter inflexa. Stigma antheram paullum superans. Capsula oblonga trilocularis calyce coronata, dehiscens valvis 3 carnosis revolutis.

Folia 150 × 90 — 250 × 80; petiolus 120—150, vagina 130 mm. Caulis 30 mm., pedunculus 40 mm. Inflorescentia, vaginae folii peduncularis inclusa 50 × 15. Bracteola 53 × 8 mm. Calyx 25 mm., apice spathaceus, 6 mm. latus. Corollae tubus 58—68 mm. Petala 20 × 4. Staminodia 15×5. Labellum 20 — 25 mm. × 15.

The habit of inflorescence and flower as well as of the vegetative parts of this species is very similar to that of *G. panduratum*. But it is a much smaller herb and the fleshy rootfibres, which are cylindric-clavate in that species are here cylindric biform partly 25 — 66 mm. long, and ramose with articulate cylindric, members, partly simple elongate (50—80×5) ending in an elipsoid sometimes apiculate tuber. The flower is very different (see our figures) for the anther is shaped like that of *G. Curtisii*, with cells opening by terminal pores and with a short bidentate crest on the fleshy back of the connective.

It is indeed allied very nearly to *G. Curtisii*: and differs from it only by the following characteristics:

G. Curtisii: Leaves pubescent on the back; bracts as long as the calyx, staminodes *oblong lanceolate;* thecae of the anther much projecting, crest almost truncate, labellum redbordered, yellow in the middle.

G. javanum: Leaves with scattered, appressed hairs on the back, seemingly smooth; bracts much longer than the calyx; staminodes *oblong-subobcuneate* with a rounded or truncate top; thecae shorter than the crestbearing connective, crest more pronounced and bidentate, labellum yellow in the middle, red purple spotted below the middle as are the staminodes and filament.

This species has been found wildgrowing only recently in the teak forests of Bodjonegoro (Kediri), (Mr. v DOORN and Mr. KALSBOVEN), flowering in March 1916, and afterwards by Mr. BEUME in Madiun (Febr. 1917) It was wholly unknown to the natives, who confused it with *Curcuma aurantiaca* V. ZYP, "*purod*" mal, to which the sterile herb has some resemblance. It is of no use and wants a vernacular name.

The reduction of this practically new species to *G. javanum* K. Sch. of which I saw no specimen, bases partly on the fact that the type specimen was considered by ZOLLINGER as a different genus and therefore probably was different from *G. panduratum*, partly on the term "*subobcuneate*" used by K. SCHUMANN in describing the staminodes, which in *G. panduratum* are "*obovate*." Beyond that there is not a syllable in the description which does not apply as well to *G. panduratum*, and SCHUMANN manifestly did not examine that species, as appears from his description.

Also the specimens collected by WARBURG, cited by SCHUMANN under *G. panduratum* may as well belong to either of the two species both of which occur in Kediri.

Gastrochilus Lörzingii n. sp.

Herbae semimetrales subacaules, *unifoliatae*, confertae, pilosae. Rhizoma repens, ascendens squamis paucis erectis vaginantibus, interior folii vaginam superans obtusa mucronata tenuis, (150 mm longa), exteriores multo breviores.

Folium longe petiolatum, longe vaginatum, ligulae auriculis ovatis acutis, oblongo-ellipticum, breviter apiculato-subacuminatum basi attenuatum invivo subtus versus apicem purpurascens.

Folium 300 × 120, petiolus 175, vagina 125., Lobi ligulae 10 × 5. Inflorescentia longe pedunculata (*G. javani* modo) inter folii vaginam et squamam inclusa, nunc circ. 12-flora, bractea primaria (vaginae opposita) 55 mm longa acuminata, rachis sericeopilosa, 15 mm. longa.

Flores 55 mm longi, calyx bilineatus, bidentatus, villosus 18 mm long; petala lanceolata, pellucide 3-5 lineata, albida ± 12 mm longa. Staminodes late oblonga spice rotundata petalis sublatioria et $^1/_3$ breviora, cremea, 9-11 venia. Labellum late obovatum, secundum collectorem "rhomboideum, non saccatum, 18 × 12 mm. longum, flavum, medio luteum basi marginibus 3 mm. latis albidis; unguis canaliculatus medio minute rubro-punctatus". Stamen staminodiis brevius. Filamentum breve, thecae poris dehiscentes. Connectivi crista antherae aequilonga canaliformis, bidentata dentibus parallilis subulatis demum recurvis. Stigma latum. Habitat: S. W. Sumatra, Sibulangit in sylva 300-500 mm.

By the habit, leaves and inflorescences it resembles very much *G. javanum*, but there the leafsheaths are a litle wider, the flowers much larger, the lip more elongate and a litle deflexed, while, here, it is rhomboid or even obtrigonous.

In both however the labellum is distinct by the dense flabelliform innervation, and the three nerved middlebar which expands in a deltoid fascicle to the undulate margin.

var. *B. bencoolensis*

Herba *bifoliata*, G, javanum facie valde similis foliis quam in genuina nunc angustioribus, vaginis latioribus crasse coriaceis. Bractea primaria coriacea apice spinescenti-producta. Calyx quam in genuina brevior, (14 mm.), stylodia brevioria (6 mm.), labellum obtrigonum, margine superiore subtruncato, valde crispo, longit. plicatum. "Flores albido-flavi".

Bencoolen, on the western declivity of the Talaman, 500 M., BUNNEMEYER 532.

The materials are very scanty, better matterials might prove to belong to a different species. The anthera-crest however is in both the varieties and in the type crowned with a narrow bi-apiculate crest, by which it differs from all related species.

var. *G. bandarensis*. Herba *bifoliata* vel subtrifoliata. Folia cum petiolis et vaginis 700 mm. longa, squamae vaginantes ad 140 mm. longae. Ligulae lobi elongati, 15—20 mm. longi, acuminati. Calyx floris 18 mm longus, stylodia longissima 10 mm. Calyx villosissimus. Inflorescentia densiflora 70 mm. longa. Bracteae acuminatae villoso-pilosae, primariae 70 × 15. "Flores albido-flavi. Labellum in parte superiore unguiculi macula oblonga rubra fugaci notatum."

Sibulangit, above Bandar 1000 M. in virginal forest LÖRZING 1728. This form is much more robust and more hairy than the type and the colour of the flowers is a litle different. Also the long acuminate ligula and acuminate bracts seem different.

Gastrochilus pulchella, Ridl. 1906, 235.

Stems several, short, covered with red sheaths, 2 inches tall. Leaves 3, ovate to lanceolate acute, base rounded, $3^{1}/_{2}$ inches long, $1^{1}/_{2}$-2 inches wide, bright shining green with about 8 pairs of nerves conspicuous above, petiole 1-$1^{1}/_{2}$ inch long. Spike shorter, acute, several flowered, bracts lanceolate acuminate cuspidate red. Flowers opening singly. Corolla tube just projecting, about 1 inch long, lobes linear oblong obtuse white. Staminodes rounded oblong yellowish shorter than the stamen. Lip $^{1}/_{2}$ inch long, entire, sides elevated, saccate, white, a bifurcate central bar and the broad and rounded tip cherry crimson. Filament short, anther oblong not crested, pubescent.

"Sarawak Bidi, Jambusan Caves. In wet woods. Flowering September to January.

This resembles *G. pulcherrima*, Wall. of Burma, but differs in its smaller size, short stem, leaves and spike, the lip is beautifully coloured with its crimson red tip behind which is a white spot surrounded by the arms of a redy of which the stem runs to the lip base." (RIDLEY. non vidi.)

Gastrochilus apiculatum Val. (Tab. nostra 11.)

Herba parva. Rhizoma teres tenue, longum, repens apice ascendens Caulis erectus dense foliatus, vaginis alternis crassis glabris inclusum. Folia numerosa (nunc 10) obcuneato-elliptica apice subabrupte *apiculo acutissimo terminata*, basi cuneato-attenuata supra glabra subtus parce appresse pilosa imprimis ad costam. Petiolus gracilis haud longus; vagina petiolo duplo longior in sicco valde coriacea glabra an glabrescens? Ligula biloba lobis longissimis linearibus (in sicco fere capillaribus), hirtellis.

Inflorescentia breviter spicata terminalis, vaginae folii penultimi subinclusa; vaginis binis alternis imbricatis quarum altera laminifera, involucrata, a bracteolis numerosis aequilongis cum floribus numerosis conflata.

Flores parvi Calyx parvus tubulosus, apice spathaceus, bracteola multo minor, pilosulus. Corollae tubus puberulus calyce plus duplo longior. Labellum obovatum apice integrum (?) basi subcanaliculatum, 12 × 8, faux hirtellus. Staminodia lanceolata petalis minora. Petalum dorsale lanceolatum apice subcucullatum, lateralia similia Stamen fere *G. Curtisii,* breve. Anthera subincurva thecis parallelis oblongis *poris dehiscentibus*, connectivo crasso hippocrepiformi apice paullum prolongato bifido, an bidentato.

Habit of *G. panduratum* but in all parts smaller. The stem, covered by the alternating leaf sheathes, is 60 mm. long and 2 mm. thick, puberulous, the internodes circ. 5 mm. long. Leaf sheaths 40-60 mm., petioles 40—25, blades 150—160 × 45—50, of a pale brownish grey colour, paler on the back.

The inflorescence as in *G. panduratum* and *G Curtisii*; bracteoles numerous acute. Flower 50 mm. long (in sicco) Bracteole very close convolute, 27 mm. Calyx 10 mm., ovary linear. Stylode 4 mm. Corolla-tube 35. Dorsal petal 12 × 4. Lip 12 × 8 with a white or yellow centralbar in the lower part, bordered by a brown or violet cloud. Faux hairy, dark coloured. Stamen 10 mm. (fil. 3, thecae 6 crest. 1.); *cell opening with terminal pores.*

Habitat: Borneo Amai-Ambit, 1080 M., Hallier 3176 B in Herb bog. (unicum!) A very distinct species, not yet described.

This species is nearest to *G. Curtisii,* and it agrees in many ways with *G. hirtum* Ridl 1909, 57. from Sarawak. But in that species there are two leaves only, and the petiole and sheaths are densely pubescent; the petal and lip are only 6 mm. long; the anther crest is rounded.

Gastrochilus hirtum. Ridl. 1909, 56.

"Stem short covered with hairy sheaths. Leaves 2 obovate oblanceolate subobtuse mucronulate, much narrowed to the base, 6—7 inches long 2 inches wide, about 6 pairs of nerves conspicuous, glabrous, petiole and sheath 3 inches long hairy densely. Spike central, subcylindric thick, 2 inches long. Bracts lanceolate cuspidate with long acuminate points thickly hairy. Floral bracts lanceolate cuspidate 1 inch long densely hairy. Calyx $^1/_2$ inch long, ribbed hairy. Corolla white, tube slender cylindric, over an inch long hairy, lobes lanceolate obtuse $^1/_4$ inch long hairy. Staminodes narrower acute. Lip hardly longer oblong obovate entire, apex truncate, shortly toothed. Stamen crest ovate rather small, entire.

"Borneo: Sarawak, Tiang Layu (J. HEWITT).

"Flowers pale white, lip with some red centrally." Nearest perhaps to *G. Curtisii*, Bak., but the flowers are much smaller"

(RIDLEY, non vidi)

Gastrochilus striatum Val. n.sp. (Tab. nostra 13)

Herba parva glabra. Rhizoma tenue repens stoloniferum. Caulis ascendens foliatus in apice rhizomatis, bulbo nullo, elongatus brevis, vaginis foliorum alternantibus et dense imbricatis vestitus, cum bracteis ± 100 mm longus, denudatus ± 25mm, longus 50. Folia saepe 7, biseriata vaginis imbricantibus breviter vel brevissime petiolata oblongo-lanceolata acuta basi acuta vel attenuata, subcoriacea, sive pergamacea, glabra, in sicco longitudinaliter striata, costa subtus prominente, venis ascendentibus costae sub parallelis, densis prominulis, vaginae ad foliorum laminas fere longitudine accedentes, in foliis superioribus 2/3 folii aequantes, in herbario stramineae dense costulato striatae, margine lato membranaceo, ligulae lobis *valde elongatis linearibus acutis* terminato.

Spica abbreviata in apice caulis sessilis, vaginae folii summi normalis cum bractea singula vaginiformi lata, folio opposita, inclusa. Bracteolae florem involventes numerosae, membranaceae apice acutae.

Calyx corollae tubo multo brevior subtruncatus, tenuis, corollae tubus bracteam nunc circ. aequans; ovarium lineare ovulis ad placentam centralem adhaerentibus, septis evanidis. Petalum dorsale rostrato-cucullatum, filamentum longiusculum, anthera angusta appendiculo, ipsi 1/3 breviore, obovato, lobo mediano projecto 3 denticulato, lateris incurvis, thecae contiguae, lineares basi attenuata.

The stem with the leafsheaths is ± 100 mm. long, if the latter be removed, only 25-50 mm. The mean length of the sheath is 50-80 mm. The leafblades which get taller getting nearer the top are 60 × 6 (the outmost one) to 140 × 24 (the innermost one) of one herb. Petiole 5-15 mm; ligula 8-12 mm long. Spike very short, included (as in *G. pandurata* and *G. Curtisii*) between the sheath of the innermost leaf and a large sheathlike bract opposite to it. The flower measures 40 mm, the calyx 15, the bracteole 40; the upperpart of the flower has been destroyed with the exception of the dorsal lobe which is cucullate as in *G. panduratum* and the upperpart of the stamen; here the contiguous linear thecae, 3-5 mm long, adnate to the borders of the incurved connective and crowned by the obovate 2-5 mm long rather broad appendix, which has a projecting $^1/_2$ mm. long three-toothed midlobe are very well preserved. The anther seems very much to resemble that of *G. grandifolium*, only the thecae are rather long and attenuate at their base, and there are no pores visible allthough the content of the cells has been lost.

Habitat: West-Borneo, Singkadjang, a vilage in the lake district of the Kapoeas, near Sintang, Teysmann 10992, (23 aug. 1874; nom ind. "Rassa smilu").

This species was named "*striatum*" because of the (in a dried state) very conspicuously striate or ribbed, somewhat shining, very tall and broad sheaths. The flower was much damaged, but the stamen was rather good

preserved and reminds very much of *G. grandifolium* by the large channeled crest, which however is distinctly 3 toothed in the middle.

By the leaves and the anther it seems to be very like *G. bractescens* Ridl. 1909, 57; which was collected at Lundu, near the coast, west of Serawak. (FOXWORTHY 42). But in *G. bractescens* the inflorescence is peduncled, branched and axillary.

Gastrochilus violaceum, Ridl. 1909, 56.

"Leaves 2 or 3 together, rather fleshy smooth dull, dark green above, central line pale beneath, nerves ineonspicuous; 3 to 5 inches long $1^1/_2$ inches wide, ovate obtuse, petiole 1 inch long. Spike short of many flowers, *from the leaf axil,* 1 inch long subsessile. Bracts lanceolate acuminate. Bracteole lanceolate acuminate with a long point, $^3/_4$ inch long, glabrous thin. Calyx tubular with 2 long acute teeth, 3/8 inch long white. Corolla tube cylindric slender creamy white 3/8 inch long, lobes narrow lanceolate acute white $^1/_4$ inch long. Staminodes erect little more than half as long, linear subacute broader than the petals. Lip spathulate, claw with sides raised linear, limb obovate oblong, *emarginate* little more than half an inch long and 3/10 inch wide, violet with a central-primrose yellow bar, edge with minute glandular hairs as are the staminodes. Stamen white half as long as the dorsal petal, filament broad pubescent. Anther short oblong, crest very short truncate obscurely 3 toothed shorter than the style."

"Cultivated in the Botanic Gardens, Singapore from plants suplied by T. D. PEREIRA, Fl. Oct. 1890. It is believed to be from Padang, Sumatra. Something of the habit of a *Kaempferia* with flowers of *Gastrochilus.* The violet colouring of the lip is unusual in that genus."

Gastrochilus grandifolium Val. in. Ic. bog. tab. 377. (1914)

About this species I made some new observations omitted in the first description.

The young shoots consist of 5 midlesized leaves, the large imbricating sheaths of which form a short pseudo-stem. After the appearance of the 5th leaf the topgrowth is suspended, and the rhizome produces a vigorous sidebranch bending upward and forming the spike. It consists of 5 blunt sheathing scales 25, 40, 80 long (sometimes much taller) including the fertile leaf which grows to a length of at least 700 mm. with the petiole and sheath, the scales are equally red brown coloured, the bud of the young leaf is purple tinged at the back.

The leaves of the sterile shoot are from 100—250×50—60 mm. long, decurrent in a channeled petiole 70 mm. tall, ending in a broad sheath of the same length. The sheaths consist of the fleshy back portion, continuing the petiole and the equally broad very thin marcescent margo the free tops of which are finely acuminate and form the 25—30 mm. long thin ligula-lobes. The leaf blade is somewhat coriaceous rigid, shining green above, somewhat glaucous on the back side. The costa and sheath are pale purplish brown, marmorate. All parts are covered more or less densely with the long thin appressed hairs, so common in the genus. This division of the herb into a multifoliate, commonly sterile (rarely flowerbearing) shoot and a unifoliate (rarely bifoliate) flowering shoot are not yet described as far as I know.

The inflorescence is enclosed within the 20 mm. wide leafsheath and the large outer bract, it is shortly peduncled with the enclosing leaf (as in *G. panduratum*, only much shorter) and the peduncle is quite hidden by the large outer scales. The spike is very dense bracteate but the rachis is rather longer than in *G. panduratum*, 25 mm. long and bearing ± 20 alternating membranous hairy bracts at distances of 1—2 mm. Those are all inserted at the ventral side of the rachis, which is denudate at the backside, thus the inflorescence is essentially equal to that of *G. pulcherrimum* Wall; only the distances between the bracts are much shorter than there, and the bracts themselves, being excluded from light, are white and hairy. The flower is involucrated by a convolute bracteole shorter by 1/3 than the corolla tube and much longer than the calyx.

This species was collected by NIEUWENHUIS, No. 936 and 939 Herb. bog, in central Borneo at Tebululan-Teputing in 1896-97. There are no notes. It flowers every year in the Hort. bog. on a rather dry place in a humus containing soil during the rainy season. The white and red flowers are small and hidden.

Gastrochilus latilabrum Val. n. sp.

Herba unifoliata a rhizomate brevi oriunda. Caulis erectus (ascendens?) brevis ad 40 mm. longus, squama exteriore parva, interiore elongata vaginante inclusus. Folia mediocria longe petiolata, petiolo basi in vaginam multo breviorem angustam fragilem dilatato, elliptica vel late lanceolata, apice acuta vel obtusa, brevissime subacuminata, basi acuta, vel obtusa vel rotundata et abrupte in petiolum acuminata, crasse membranacea, juvenilia supra glabra subtus pilis tenuibus appressis parce conspersa, nervis lateralibus parallelibus subrectis usque ad medium e costa exortis utrinque prominulis tenuibus pertensa, venis tenerrimis densis parallelibus, sub lente dense transverse reticulata, adulta supra schistacea, nervis impressis. Folia 125 × 65 — 155 × 55 mm.; petiolus cum vagina 85—100, vagina 30—40 mm. longa, 5—6 lata. Ligula parva fragilis.

Inflorescentia terminalis folii vagina conduplicata et cum illi squama vaginante inclusa, spicata, rachi tenui *unilaterali*, bracteis densis rachi multo longioribus cymbiformibus imbricata. Flores basi bracteolis sat magnis inclusi. Ovarium oblongum acute trigonum nervoso-striatum, 3-loculare (in juventute scilicet) septis tenuibus fragilibus, ovulis erectis haud numerosis placentae

axili undique affixae, nunc 12-14 quorum tamen pleraque obsolescentia. Stylodia 2,5 mm. longa. Calyx spathaceo-tubulosus 3 nervis, tridentatus, dentibus ciliatis, 5 mm. longus. Corollae tubus 50 mm. longus. Petala ovato-oblonga obtusiuscula, *uninervia*, subobliqua, 10×4 mm. longa. Pet. dorsale cucullatum apiculatum anticis multo latius; labellum obovatum (insingulo specimine projecto) profunde bipartitum (in alabastro integrum emarginatum), lobi semi-obovati, margine interiore venis rectis parallelis 2 cum tertio divergente, numerosis tenuioribus flabellatis, pertensi, 14×6 mm. longi.

Staminodia obovata rotundata petalis cire aequilonga labello breviora. Stamen exsertum circ. 5 mm. longum filamento brevissimo, antherae thecae breves teretes, rimis dehiscentes crista ipsi longiore, lata recurva. Stigma cyathiforme compressum altero margine ciliatum. Fructus ignotus.

This species differs from all other Gastrochilus which I examined by the *Kaempferia*-like lip, and herein and by the solitary leaf it seems rather near to *G. bilobum* Ridl. and *G. oculatum* Ridl, differing from both however by the inflorescence, the shape of the leaf etc. By its habit it resembles *Haplochorema decus sylvae*; but because of the three-celled ovary it cannot be reduced to that genus.

By the habit and inflorescence it seems to be nearest to *G. grandifolium*.

Habitat: Borneo, Selebulan. Teputing, leg. Nieuwenhuis n. 872, (1896-97).

Gastrochilus laxiflorum Val. n. sp. Tab. nostra 13.

Herba parva, subacaulis, glabra, Rhizoma verticale articulatum, radices numerosos filiformes teretes horizontaliter repentes ex quoque nodo producens. Folia numerosa subradicalia, longe petiolata, vaginis petiolis brevioribus latis membranaceis, ligulis ovatis, brevibus. Laminae lanceolatae acutae, basi acutae vix decurrentes, petiolis cum vaginis paullum longiores, pergamaceae, costula subtus prominente, ceterum subavenes vel minute per longitudinem striatae. Spica elongata, laxe bracteata, radicalis pedunculo gracili, vagina folii subincluso, petiolo longior. Bracteae florigerae remotae haud imbricantes nunc circ. 7, cymbiformes, dum explanatae lanceolatae, acutae, 40 mm longae 10 latae, subcoriaceae (coloratae?), 3-7-florae. Flos parvus bractea brevior, lateraliter protrudens, bractea secundaria primariae simili sed triplo minore basi involutus, bracteolis binis minutis late obovatis mucronatis florigeris) comitatus. Calyx late tubulosus supra medium spathaceus unidens vel bidens. Corollae tubus calycem plus duplo superans, petala lanceolata, acuta tenuia parva avenia, dorsale mucronato-cucullatum. Labellum obovato-cuneatum, parte superiore suborbiculari apice ad 1/3 incisum parte inferiore in unguem canaliculatum longe attenuata, centro linea hirtella non praeditum; petalis duplo longius, in sicco antice convexum.

Staminodia oblonga apice rotundata, in flore adulto exsiccato petalis simillima, in alabastro petalis multo breviora.

Stamen staminodiis brevior; thecae lineares, antice per longitudinem dehiscentes, apice acutae basi subcalcarato-acuminatae et liberae. Connectivum in cristam magnam (anthera duplo breviorem) concavam (bidentatam an bifidam) recurvam prolongatum. Stigma cristae basi inclusum hirsutissimum; stilus tenerrimus, stylodia minuta acuta, ovarium lineare.

Caulis foliatus circ. 10 mm. longus. Folia 130 × 17 - 180 × 25, petioli graciles circ. 40-50, vaginae ± 30-40 mm. longae, 3-4 mm. latae, stramineae, ligulae lobi paw ovati.

Spica 130-150 mm, internodiis 10 mm longis, pedunculo 40 mm, gracilis. Bracteae 30-40 × 6-10. Bractea secundaria floris basin includens 12 mm. longa. Bracteolae 4 × 35 mm. Calyx 7 mm., tubus 16 mm., petala 8-9 mm. longa, labellum 12-13 × 8, unguis 7 mm. long. × 4; staminodia 8 mm. longa, stamen 7 mm., ad 3 mm. incisum lobis acutiusculis.

The rhizome of the only plant in the herb is vertical 40 mm long and consisting of short internodes (5 mm. long), very thin at its lowest end and there producing a bushel of rootfibres, covered with short scales and increasing in thickness unto the upper end where the leaves are beginning. From the nodes alternating, very long creeping rootfibers are coming forth, no tubers, no thickened roots.

The leaves are densely conferted imbricating with their sheathing base. The spike is seemingly axillary, its base enclosed in the leaf sheath at the top of the rhizome, surrounded by a few large sheathing scales and three unto five leaves. In our specimen there are two spikes, the younger apparently issuing from a side branch of the old rhizome.

Habitat: Borneo occidentalis prope Montrado in monte Opi, 300 M, leg. TEYSMANN (5 nov. 1874.) 10916.

This species is very conspicuous by the long slender radical, long peduncled racemose inflorescence, with large distant and patent bracts. In the young spikes the bracts are evidently somewhat imbricate for they surpass the internodes 3 or 4 times in length, but in the adult spike they are diverging, remote and leaving the rachis quite free. It is apparently very near to *G. malaccanum* K. Sch. (Scaphochlamys BAKER).

Gastrochilus angustifolium Hall. 1898, 358.

This species has been described in an ample way by HALLIER as to the colours and dimensions of all parts. There are however to be added some interesting details regarding the inflorescence and flowers: The ascending top of the rhizome forms a short supraterraneous stem, bearing a tuft of bifarious imbricate leaves, separated by short internodes (5—10 mm. long). There are no petioles, the narrowed base of the linear-lanceolate concolorous blades passing immediately into the long (70—100 mm.), channeled sheaths, which are purplish brown, mottled in their lower part.

The margins of the sheaths are very thin and marcescent, and are soon lost in the herbarium; they end in the lanceolate blunt ligula-lobes (10 mm. long), connected within the sheath by an inconspicuous transverse strip. The inflorescences arise *laterally* from the nodes of the rhizome, as well from some of the outermost scaled ones as from the leaf-axils. The former are nude only involucrated by appressed brown scales, the latter enclosed within the leafsheaths. They consist of thin short spikes at the top of short (5—10 mm. long) fleshy, branched, brown side-twigs. In the simplest case each sidetwig bears 2 to 4 sessile spikes in a row.

The spikes are composed of two or three thin greenish white, 5—10 mm. long, straight internodes, much flattened and dilated to their top (in a dried state capillary-clavate), forming a flexuose rhachis continuing above the youngest flower into a clavate capillary rudiment, 15 mm. long.

There are three or four distant primary bracts, erect, appressed to the rachis, not imbricating, only a little longer than the internodes. They are cymbiform, acute, 15—20 mm. long, smooth but covered with rare appressed conspicuous hairs, of a somewhat rigid consistence, mottled pale purple brown.

The primary bracts embrace one flower each, enveloped by the thin membranous convolute bracteole, little shorter than the bract, (15—18 mm.) The calyx is only 5 mm. long, tubular, truncate. The corol tube is 10 times as long, slender and almost not widened at the faux, which is not hairy within. The petals are oblong, obtuse thin, of the same shape, subcucullate, 13×4. The labellum is obovate 20 mm. long, 15 mm. wide above the midle, patent with a broad semilunar crisped foremost portion and deep very concave lower part, which is grandually narrowed at the somewhat villous base and there connected to the staminodes and filament, forming a funnelshaped faux. The staminodes are linear-obcuneate or spathulate with a round top, as long as the stamen (13 mm.) and adnate to the lower half of the filament, connecting it with the base of the labellum.

The stamen is erect, the filament strapshaped 5 mm. long and adnate to the staminodes over 3 mm. The connective is continuous, oblong, prolonged above the cells into a very small (1 mm. long) rounded crest. The cells are linear, dehiscing longitudinally, 7 mm. long; they are abruptly narrowed at their base into a very small but distinct spurlike appendix, formed by the valves, not by the connective. The pollen is aculeate.

The concave part of the labellum is red purple, with white mottlings, of the same colour are the base of the staminodes and filament. There is a yellow spot in the center of the labellum; the other parts are white.

Habitat: West-Sumatra. Cult Hort. bog. flowering Aug. 1917.

Evidently this species is very nearly allied te *G longiflora* Wall., though the shape of the leaves is rather different, by the construction of the flower. The shape of the labellum, saccate and connate at its base to the staminodes, is almost identical with that of *G. longiflora.* Wall.

But while in *G. longiflora* the cells are longer than the connective, here the connective is a little prolongated above the cells., whereby the theory of Ridley about the useless of this characteristic is once more incontestably proved.

The small spurs at the base of the cells have some resemblance to those described by Gagnepain in one or two species of *Hitcheniopsis*, a group which seems to be more or less intermediate between *Curcuma* and *Gastrochilus.*

Gastrochilus gracile Val.

Herba parva gracilis, e rhizomate repente ascendens. Caulis nunc 100 mm. longus, vaginis foliorum alternorum apicibus imbricantibus vestitus, glaber, circ. 8—foliatus. Folia petiolata ovato-lanceolata acuta, basi obliqua subrotundata vel acuta, tenere membranacea, glabra, 100—150×30. Petiolus tenuis complicatus 30—50 mm. longus, vagina 40—60 longa tenera, auriculae scariosae fugacissimae in apice caulis ± 6 mm. longae, lanceolatae acutae.

Spicae axillares, usque in apice caulis, singulae, graciles pauci-bracteatae. Rachis nunc 35 mm. longa, dimidio superiore capillari sterili. Pedunculus brevis, bractea inferior parva sterilis. Bracteae florentes nunc tres distantes *uniflorae* 20 mm. longae acutae, glabrae. Flores bracteola singula cum bractea convoluta. Alabastra, sine bractea, tereti-clavata, obtusa. Calyx minutus (5 mm.) hyalinus apice subtruncatus, late 3-crenulatus. Corollae tubus elongatus (± 30 mm.) Petala 10 mm. longa, oblonga apice rotundata. Labellum late oblongum integrum, parte inferiore concava, superiore elongata crispa. Staminodia lateralia linearia, petalis fere aequilonga erecta. Stamen elongatum, petalis fere aequilongum, filamentum lineare anthera brevius. Anthera linearis thecis rectis *basi apiculatis,* connectivo supra thecas vix producto. Habitat: Sumatra, Bencoolen, ad clivatates occid. mt Talaman 500 M. leg. Bunnemeyer, no. 545, 1/5 17 “flowers pale lilac”.

By the construction of the flower and axillary inflorescence this species is very similar to *G. angustifolium,* the stamen with the spurred thecae is quite identical, only a litle smaller. The spike is more slender and not branched at the base. The habit however is very different.

Gastrochilus bractescens, Ridl. 1909, 56.

“Stem woody creeping with long wiry roots. Leaves numerous lanceolate long petioled, obtuse acuminate at the base, blade 5 inches long 1 inch across, petiole 3 inches long base 2 inches sheathing with a narrow sheath margin. Inflorescences *axillary* on erect peduncles 1 inch long, at first obcuneate 1 inch long, of 4 branches each an inch long subtended by convolute lanceate obtuse bracts. Bracts at length spreading, an inch long 1/5 inch wide, enclosing the spikes. Flowers numerous in the spikes, small, white. Bract to spike oblong obtuse ribbed. Floral bracts small. Calyx tubular rather thick 3 lobed, lobes short obtuse, split shortly on one side, as long as the corolla tube, 1/5 inch long. Corolla tube thick, lobes linear oblong obtuse longer than the tube. Staminodes narrower, linear oblong. Lip short obovate more fleshy *entire*. Anther linear oblong *with* a *quadrate crest 3 toothed* shortly at the tip."

"Borneo: Lundu (FOXWORTHY 42)." (RIDLEY, non vidi)

Gastrochilus anomalum (Hall. f.) K. SCHUMANN 1904. — *Gastrochilus Hallieri* Ridl. 1899, 109. — *Kaemferia anomala* Hallier 1898, 357, tab. 9.

The specimen grown in the Hortus bog. has been lost and no herbarium appears to exist. From the rather bad drawing I conclude that the inflorescence is a radical olongate spike longer than the petiole and bearing several distanced bracts (spikelets), which do not imbricate, and probably include some secundary bracts; neither these nor the bracteole however were mentioned. HALLIER says "spike sessile solitary on the top of the ("erect":) stems ("rami") which bear one or two leaves with long sheathes and petioles". RIDLEY however who examined the plant places it among his *exanthi*. The labellum is obovate unguiculate, not concave, and shortly bifid. The stamen appears to resemble that of *G. angustifolium* by the long filament and not or not much prolonged connective. Probably the inflorescence is radical in the axil of the leaf, as it is in *G. angustifolium*. But the shape of the labellum, which induced HALLIER to consider it as a *Kaemferia*, does not point to a near alliance with the latter. Schumann suggests that it might belong to Haplochorema, but the flower does not resemble that of *H. uniflorum*.

Gastrochilus? Kunstleri Val. — *Hitcheniopsis Kunstleri* RIDLEY (subgenus). *Curcuma Kunstleri* Bak. (1890, 214); Ridl. (1899, 120). — *Kaempferia* Hort. bog. msc; — COSTERUS, das Labellum etc. 1915; — *Kaempferia* nov. sp. GAGNEPAIN msc. Herb. bog.

The study of living specimens of this species elucidated the fact that it has been placed wrongly in the genus *Curcuma*, with which it has not more in common than e.g. with *Alpinia*. See page 9. A discussion of the structure will show this luce clarius:

Habit: The habit is much more reminding a *Gastrochilus* than a *Curcuma*, the leaves are purplish at the back side, a character never observed in a *Curcuma*, often in *Gastrochilus*.

Inflorescence: Owing to the broad imbricating numerous bracts the infl. is strobiliform but the bracts are affixed with their broad base to the axis, concave and erect, imbricating but with free margins, forming pouches by means of their stiff turgescent structure, but these are open laterally and not to be compared with those of *Curcuma*. If isolated they are smooth at their backside, much broader than long (35 × 50) while those of *Curcuma* always show the scars of the lower, adnate bracts. The bracts are all equal, no coma. The spikelets consisting of 3 or more flowers are enclosed in convolute, not cymbiform bracteoles. The peduncle is slender short without a peduncular leaf.

Flower: The flower is 70 mm. long. The ovary is elliptical, glabrous, normally 3-celled but often one celled with an axile placenta, with erect ovules reminding *Haplochorema*. (see Pl. 14). The stylodes are extremely long and thinly subulate (12 mm.). The stigma is beaked, different both from *Gastrochilus* and *Curcuma*.

The calyx is short (16 mm.) wide tubular, sheathing at the top, if explanated it is ovate subacute, minutely three denticulate.

The corolla tube is a little longer than the bracts (38 × 3) gradually dilated above the middle into a slender infundibular faux (5 mm. wide.)

No cupshaped faux, no hairy annulus.

The petals are thin ovate lanceolate (18 × 6) subacute, the dorsal one (20 × 9) subacute, subcucullate, blunt, not fornicate, not rostellate.

The staminodes are free from the stamen and inserted between this and the lip, a little to the outside, they are shorter than the petals, obovate-elliptical, with a broad base, sideway overlapping the stamen, puberulous.

The lip is obovate rounded entire (not three lobed) expanded (not curved upward) incised at the top unto 1/4 of the lengh, straight rigid, without a thickened central bar and instructed in the lower half with two parallel rails, forming a kind of gutter which leads to the faux, and passing into the base of the stamen. Evidently this constuction of lip and staminodes has not the least resemblance with that of *Curcuma*.

The lip measures 25 × 20 mm. It is creamcoloured (171) with a lemon yellow (211) centre with fanlike pellucid, white and reddish veins.

The filament is short and broad, 3 to 4 mm. tall and wide, and continues without a narrowing into the wide fleshy connective. The anther-cells are parallel, linear, adnate to the incurved margins of the connective which projects on both sides; with a short free pointed base; the tips of the cells pass into the incurved borders of the short fleshy emarginate prolongation, only 1 mm. long. The anther measures 6 mm. and is 3 mm. wide. Stamen and staminodes are puberulous on the back. The pollen is broadly elliptic, smooth, not cohering.

The fruit is still unknown.

Kaempferia L.

Linn, Gen. pl. 1737, 331; Ridley 1899, 110; K. Schumann, 1904, 65 (exparte); Gagnepain, 1908, 46 (exparte) — *Curcuma* Linn. Musa cliffortiana (1736).

Diagnosis emendata.

Calyx tubulosus, superne breviter spathaceo-fissus, minute inaequaliter dentatus corollae tubo multo brevior vel aequilongus (*K. rotunda*). Corollae tubus elongatus, lobi aequales elongati lanceolati saepe convoluti patentes. Staminodia lateralia petaloidea, plana, expansa, elliptica vel oblonga vel obovata, unguiculata, saepe labello similia. Labellum planum, ungue haud canaliculato, magnum, haud longius quam latum saepe latissime obovatum, ad medium bifidum vel bipartitum lobis rotundatis, staminodiis lateralibus haud absimilibus et cum iis crucem referentes. Stamen in apice faucis angusti insertum filamento brevissimo vel subnullo, (in *K. fissa* Gagn. subelongato); anthera linearis saepe angusta ex orificio faucis haud exserta, thecae dissitae per longitudinem dehiscentes ad margines connectivi angusti vel latioris, ultra loculos producti in cristam vulgo maximam (in *K. candida* Wall. brevem) integram vel bifidam vel dentatam saepe reflexam, ex fauce angusto exsertam. Gynaecium et stylus *Gastrochili*, stylodia subulata; in *K. cuneata* Gagn. (1905, 546) deficientia (fide auctore). Pollinis granula globosa, laevia, incohaerentia. Inflorescentia capitata bracteis numerosis, fertilibus externis majoribus, subinvolucrantibus, interdum binis majoribus propriis involucrata, multi-vel pauciflora, floribus spiraliter insertis, bracteolis tenuibus hyalinis bidentatis vel bifidis, breviter vel modice, raro longe, pedunculata, inter vaginas foliorum tota inclusa vel exserta, interdum praecox. Herba radicalis vel caulescens. Folia nunc bina, nunc 2-8, vaginis vulgo valde elongatis, petiolis brevibus vel brevissimis, ligula vulgo inconspicua vel parva. Fructus in perpaucis speciebus descripti globosi vel elliptici, pauci-vel multispermi, triloculares.

For the comparison between this genus and *Gastrochilus* in its wider sense, the reader is referred to page 82, 83 where a considerable number of species ranged by Schumann with *Kaempferia* were discussed under *Gastrochilus*. Leaving aside those species comprised under *Stahlianthus, Camptandra, Stachyanthesis* and *Hapochlorema* the genus is now very homogeneous, a fact proved e. g. by the inflorescence which though in exterior habit rather varying, analogous to *Gastrochilus*, really possesses a common character, very different from that genus.

The following modes of inflorescence are to be found in this genus.

Few flowered abbreviated spike?, sessile, terminal on the erect foliate stem, involucrate by the large oblong, acuminate, terete green bract, bracteole 3-fid: *K. secunda*. Hooker (1888), tab. 6999.

Fewflowered long peduncled terminal head, peduncle sheathed by the radical leaves, narrowly oblong, involucrate by a spathaceous terete bract with a rudimentary blade; green, redvariegated, with an opposite smaller green acute bract: *K. elegans* Wall (1830) III 24, t 27.

Sessile fewflowered (1-3-flowered) head or fascicle, terminal on the stemless bulb, no special involucre, surrounded by the long radical leafy scales: *K. fissa* Gagn. (1908).

Sessile manyflowered head, no special (exterior) involucre; terminal on the bulb, included by the large imbricating sheaths of the radical leaves: *K. angustifolia.*

Peduncled manyflowered head, no special involucre; terminal on the bulb, included by the erect rigid terete leaf sheaths: *K. pulchra.*
K. Roscoeana.
K. Galanga.

Manyflowered head sessile or peduncled, terminal on the bulb, involucrate by two large alternating imbricate sterile sheathing bracts:
K. rotunda L.

In Java the following species aar found, all answering to the above diagnose:

K. galanga Linn. only cultivated.

K. angustifolia Roxb, *K. undulata* Tet B., spontaneous and cultivated.

K. rotunda L., spontaneous and cultivated.

K. latifolia Bl.— (an Donn?), Enum 1827., spec. male cognita.

K. pulchra Ridl., introduced from Singapore, and cultivated in the Bot. Garden.

In Borneo:

K. atrovirens N. E. BROWN.

Species excludendae:

K. ornata, N. E. BROWN.
K. vittata, N. E. BROWN. | See Gastrochilus.
K. pandurata, Linn.
K. decus, sylvae, Holl. . . . See Haplochorema.
K. gracillima K. Sch. . . . See Camptandra.

Key to the determination of malayan species.

A. Flowering stem and leaf bearing stem on separate bulbs, anther subsessile, narrow, crest taller and wider than the anther, straight, bifid to 1/3 or 1/2: *K. rotunda.*

B. Inflorescence from the centre of the leafy stem.
  a. Leaves two (rarely 3) flat, expanded, with fleshy sheaths enclosing the inflorescence.
    a¹. Flowers white and violet, symmetrical, crest of the anther broad, bifid recurved. Leaves concolor: *K. Galanga.*
    b¹. Flowers violet, seemingly regular (cruciate), crest of the anther spathulate with a very long linear claw. Anther shorter than the crest, narrow, adnate to the tube and quite enclosed, only the limb of the crest produced. Leaves variegated: *K. pulchra* (culta)
  b. Leaves numerous (3 or more).

a¹. Sheaths and petioles erect elongate (100—125 mm.) forming a short stem. Spike peduncled. Flowers subconcolorous, violaceous; cruciate, crest of the anther oblong, entire revolute: *K. atrovirens.*

b¹. Sheaths very short, stem wanting or very short, inflorescence sessile, bracts very small, leaves lanceolate spreading with undulate margin, flower symmetrical, petals patent, longer than lip and staminodes, staminodes white, lip violaceous, crest of the anther large and wide, shortly bifid at the top: *K. angustiolia* (=*K. undulata*).

Kaempferia Galanga L; Linn. Hort. Cliff. 1787, t 3; BLUME 1827, 47; Rosc. 1828 t 92; Bot, mag. 1805, 21, t. 805: type; Roxb. Fl. ind 1820, 15; Wight Ic. 1853 VI t. 899; GAGNEPAIN, 1908, 49.— *K. sessilis* Koenig in Retz (teste K. SCHUMANN).—*Katsjula Kelongu* Rheed 1697, 11, t 41.—*Soncorus* Rumph. Herb. amb. 1740, V 175 t, 69 f 2.— *Ara-orchis tuberosa platyphyllos* Burm. zeyl.— *Colchicum indicum platyphyllum.* Herm. zeyl 54.

I examined a flowering specimen, cultivated in Djocdja, which I owe to the kindness of Mr. Hj. JENSEN from Klaten, and another cultivated in a village in Bzg.

The latter has widely elliptic leaves (95 × 55) with rounded base and a very short acute deltoid tip; the first has much larger, rotund leaves; in both these are woolly beneath and are surrounded by a conspicuous membranous, undulated redbrown margin (margin 0,75 mm. broad) as in *K. marginata*, which should not be found in *K. galanga* according to BAKER and SCHUMANN.

The flowers also differ in colour from the drawing of ROSCOE and from the description of BAKER, for there are two cuneate violet spots in the middle of the labellum which decur into elevated lines to the mouth of the corolla, bordering a concave white bar in the middle of the claw. The segments of the lip are obovate and entire or threefid, with short rounded lobes. The calyx is longer than half the tube (30 × 7) lanceolate with two fine teeth. Corolla tube 45—50 mm., lobes 25 mm. Labellum 23 mm. long 25 broad, staminodes obovate 22 × 14.

Probably both specimens belong to the var. *latifolia* (Donn) BAKER K. Sch. l.c. = *K latifolia* Donn., Bl. Enum. 07. They agree, however, rather well with GAGNEPAIN's description who mentions also the red border of the leaves; and I did not see any certain specimens of the type. The specimen collected by KDS in Celebes (sterile) has rather different leaves, *elliptical* acute at both ends (120 × 60), not distinctly brown bordered and might belong to the genuine form as does probably the original drawing in Hortus Cliffordtianus, where the leaves have the same shape.

The inflorescence of *K. Galanga* is a head; ROXBRUGH calls it a fascicle, composed of smaller fascicles, at all means it is nota spike. It is placed on the flat torus (top of the bulb) as it is in *K. rotunda*, clasped by the erect rigid leaf-sheaths and consists of 12 or more flowers; each surrounded by a convoluting bract (40 × 12 mm. long in the circumference, 25 mm. long near the centre). The outermost floral bracts inserted irregulary form an involucrum. There are no special (sterile) exterior bracts. Each flower is accompanied by two very thin linear subulate bracteoles (30-35 mm. long facing the bract which are probably originally connate at the base as they are in *K. rotunda* and *K. pulchra* (here very small.) In the drawing in Hort. Cliff. they are represented as such.

Distribution: Cultivated in Batavia and in Djocdja (vid. HEYNE l.c.) Native names "*tjikoor*" sund, *Kentjoor* jav.

I never met with specimens from East-Java, nor with wild growing specimens.

Outside of Java: In the Molucca's it was cultivated in the gardens and did not efferate. Also in Bali (Rumph, l.c.)

In Celebes, Paku-uru 400 M. cult., coll. KDS 19678, native name "Sookoor"

In Sumatra Sibulangit, on wasted ground probably efferate, LÖRZING 926.

"In the plains throughout British India". BAKER.

Cochinchina. GAGNEPAIN:

Kaempferia rotunda L. Fl. zeyl. (1737, 9); Sp. pl. (1753, 3); ROSCOE 1828, t 97; WIGHT Ic. 1853 t. 2029; SIMS Bot mag. 1806, 24. t 920; HOOK f. Bot mag t 6054; Flore des serres. 10, t. 1041; PETERSEN Flor bras. 1890, *3*, 3, 35 t 10.

Though repeatedly described and illustrated, still there are some points in the structure of this species which deserve a more ample elucidation than has been given until now. To these belongs in the first place the structure of stem and infloresscence, which never seems to have been examined.

The rhizome consists of irregular subglobose tubercles forming a rosary. From all segments are hanging numerous pendulous tubers on fleshy subrigid, cylindric, short stalks (10-50 mm long), globose and fusiform, of the size of a pea to a dove 's egg. From the top of the rhizome sprouts at first the nude inflorescence, and from this immediately the leafstem, the base of which increases to an annulated globose corm, size of a wallnut.

The size of the stem, bracts and flowers are exceedingly variable, as well dependant from the age of the herb, as from local variations. In young plants the inflorescence is subsessile and surrounded by two short radical sheathing scales, 15 and 20 mm. long. By older plants the peduncle can reach a length of 40 × 6 mm. and is surrounded by 4 alternate ovate-lanceolate scales inserted near its base and measuring respectively 10, 20, 40 and 80 mm. They have green and purplish tinged rather hard patent acute tips. The peduncle is dilated at its top to form a flat torus which can produce 10 or perhaps more flowers, expanding successively and persisting each 24 hours. It is involucrated by two large bracts the inferior of which envelopes with its wide base 3/4 part of the circumference, and sometimes the whole of it and is 65 mm. long. The opposite innermost bract is lanceolate (50 mm. long) and closely appressed against it. So they form together an involucrum much resembling that of *K. involucrata (Stahlianthus* GAGNEPAIN) but not connate. The fertile bracts which follow have the same shape but are much smaller and diminish towards the centrum in size and consistence, the outermost ones are pointed, reticulate, and coloured, the innermost thin and hyaline, they do not alternate but are inserted spirally, of inaequal size, the larger outermost forming an inner involucre to the entire head. The outermost are 20 or 25 mm. long, the innermost 15—10 mm. Each bract bears one flower and an opposite small bracteole which is oblong, thin, hyaline binerved and bidentate. the teeth being separated by an obtuse sinus. It makes quite the impression of being composed of two connate bracteoles; length about 15 mm., teeth 2 mm.

The bracts are much shorter than the corolla tube and have no part in protecting the bud; this is exclusively covered by the tubular calyx and by the convolute and long acuminate petals which perforate the calyx.

The flowers vary in length from 60 to 120 mm., the calyx from 30 to 60 mm. The latter is often pink-coloured. The lobes of the labellum are always very asymetrical, the inner edge being much more convex than the outer, they vary in length and width, measuring mostly half the length of the labellum, sometimes however a litle more. The staminodes are in the genuine form always oblong rounded at boths ends or acute at the top and with a small mucro, but in numerous forms as f.e. in both forms designed by WIGHT Ic. 1029 they are obovate-lanceolate. The appendage of the connective, bifid to the middle in the genuine form, is often not bifid but 3 dentate with a shorter middle tooth or irregularly 4 dentate.

K. rotunda L. var **concolor** Val.

Folia obovato-oblonga, apice acuta vel obtusa, acute apiculata basi longe attenuata in petiolum brevem, concoloria, inter minora. Lamina 240 × 70, petiolus canaliformis 30, vagina 80. Bracteae exteriores involucrantes ovatae acutae, exterior 30 × 14, interior 26 × 7. Br. exteriores fertiles 20 × 6, bracteola bifida 15 × 7. Flores 70 mm, haud superantes; calyx et tubus corollae 35 mm. Staminodia *obovato-oblonga*, obtusa. *Crista antherae 3 dentata.*

Habitat cult. HEYNE (from Djogdja.) This variety is possibly not very sharply distinguished from the type form, which is variable in most of its characters, and even the green not variegated leaves are often found in specimens in bad conditions. Moreover in the herbarium the outlines of the brown spots become more or lets distinct.

Distribution:

Java: Spontaneous growing socially on dry lawns and grassy way-sides at 500—750 M. Sea-level, on the Yang-mountain at Banderan, East-Java, where it was collected by BACKER (No. 9539) and JESWIET on 17 Oct. 1913 and again in 1916, and at 300 M. on mt Muria on a Javanese church-yard among shrubs, coll. by DOCTERS V. LEEUWEN (No. 917).

Also collected in teak forests, socially growing. Cultivated in all considerable villages, and towns in all parts of Java. Also efferated near Batavia, between Palmerah and Kebajoran. Not found spontaneous in West-Java?

Madura: collected by VORDERMAN, probably cultivated.

Vernacular names: In Batavia "*Temu putri*" (local name, also used in Java for different rare species of *Curcuma*); Eeastern parts of Java. "*Koentji pepet*," a certain name in Kediri, Bagelen, Madura (VORDERMAN, KALSHOVEN); in Djocdja "*Kunir putih*," (HEYNE 90), in Pasuruan local name "*Ardong*" (JESWIET).

Outside of Java: Cultivated in tropical regions, of the old and new world (South Brasiliё, St Catharina, Petersen l.c.). The original native country is not known with certitude, for, though it is now undoubtly wild growing in unhabitated regions on the Yang plateau, it is quite possible that in earlier times this region has been habitated. More over, no fruits were seen.

Probably the culture in Java is not very old, for a herb so conspicuous by its suaveolent beautiful flowers and so popular as a medicine would certainly have been mentioned by RUMPH.

According to GAGNEPAIN (1908,48) it is growing wild in Laos (Cochinchine) bearing smaller flowers and a somewhat pubescent calyx. The Javanese wild form has also smaller flowers and the calyx is very sparingly sprinkled with very thin hairs, as are also the bracts.

Kaempferia angustifolia Rosc. 1807 and 1828, t 94; ROXB. 1820,17; BAKER 1894, 219. GAGNEPAIN, 1808,52.

Kaempferia undulata Teysm. et Binn. 1855, 391 (non LINK in D. DIETR Syn.); VALETON Icones, 1914 t 376.— *K. Gilberti* Hort. bog., an BULL?

In my description of *K. undulata* l. c., I overlooked the fact (as did K. SCHUMANN) that BAKER cites this species as a synonym of *K. angustifolia* Rosc. Now, having again compared the litterature I see that BAKERS description of that species wholly agrees with *K. undulata*. Here the leaves are said to be at least 6 or 8 times longer than broad, and the lip to be cleft to the midst. On the contrary ROSCOE, in his description and drawing (as well in the first publication of this species in 1807, as afterwards in his

Monandr. plants, taken from a specimen cultivated out of rhizomes sent by BANKS in 1797.) declares the lip to be emarginate *not bifid.*, the leaves lanceolate (rather elliptical, being only two times longer than broad). Evidently here is a confusion of different forms, but about the identity of the two species I have no doubt.

I have some presumption that *K. Gilberti* of BULL the origin of which is unknown is also a synonym. A plant received years ago with that name from Europe, with variegated leaves has gradually lost its white stripes and proved identical with *K. undulata.*

The Javan specimens vary somewhat in the length of the stem, which in young and poor plants is very short; the width of the leaves which commonly makes up 1/6 or 1/8 of the length, amounts in luxurious growing plants sometimes to 1/3 and then the margins are not undulating. The flowers vary in length from 100—120 mm. The crest of the anther is sometimes bipartite to the middle, commonly however only notched. In young plants there are always two alternate leaves, outwardly accompanied by some green bladeless sheaths; during the growth this number often increases to eight, in the same time the alternate insertion makes place for an irregular one.

The inflorescence is loosely enclosed between the sheaths of the first leaves and sessile, either immediately on the top of the tuber or elevated on a short stem. The flowers and flowerbuds, about 10 in number, are here as in *K. rotundata* inserted on a flat torus, they are surrounded and intermixed by very thin and small acute lanceolate bracts and bracteoles. There are no sterile bracts, and the head is involucrated only by the sheaths of the inner leaves. The fruit I never saw, though it occurs doubtlessly.

The rhizome consists of a series of irregular tubers like a rosary; the pendulous tubers are very like those of *K. rotunda* but many times smaller.

Distribution: Spontaneous growing in the teak forests of Tomo (Sumedang) at 50 M, (KOORDERS, KALSHOVEN), native name "*Kuntji Kunot.*" Also in Semarang (Djemboloh), and Randublatung, native name "*Kuntji putih*" (KALSHOVEN).

Cultivated in Djocdja (VORDERMAN: in Herb. Bog: specimen cited by K. Sch.) native name "*Kuntji pepet*" and in Batavia (HEYNE, 1913, 218), native name "*Kuntji menir*" HEYNE l. c. "*Kuntji pepet.*"

In East-Java this species is still unknown and "*Kuntji pepet*" is the certain name for *Kaempferia rotunda* L. in Kediri, Bagelen, Soerabaja, Pasuruan and Madura.

Outside of Java: Eastern Himalaya (Bengal) at the feet of the mountains (ROXB), Siam and Cochinchine (GAGNEPAIN), not in Malacca, (RIDLEY).

Kaempferia pulchra Ridl. 1899, 107; 1907, 13; K. Schum, 1904, 79; Gagn. 1908.

Though this ornamental herb is not a native of the Archipel as far as known, the abundance of living material in the Bot. G. induced me to make some new notes about it.

This plant is curious by the regular alternation of a two leaved and a one leaved generation. The first appears as well from seedlings as from bulbs at the end of the dry season. It flowers abundantly during several weeks and than a third leaf appears from a sidebud (a fourth and a fifth sometimes follow). Their basal parts form small corms which remain a long time in connexion with the mother corm, they bud at all sides and form complexes of two or more tubercles each of the size of a small or a large pea. The new plant flowers almost immediately and this process of budding and flowering continues until the end of the rainy monsun, and then the supraterraneous parts decay. Meantime the oldest plants have fruited and the seeds which in my cultures had no means of dispersing germinated on the old decaying stock which is soon covered with the green one leaved seedlings. The leaves resemble very much those of *K. Roscoeana*, the lamina is sessile and the ligula forms distinct auricles.

The inflorescence is a small head, oblong-acute, 25—30 mm. long, 6 mm. wide, borne by a terete fleshy white peduncle now 30 mm. long 3 mm. wide, rising from the top of the small bulb (5—10 mm. in diam) and enclosed by the terete rather long (40—50 mm.), rigid imbricating alternating leafsheaths, from which only the flowers are exserted. It consists of 10—20 ovate lanceolate acute whitish green bracts inserted spirally on the flat, or at last somewhat convex, torus. They are much wider than the diameter of the head and with their thin inflexed margins are closely imbricate; all are fertile and each flower is accompanied by a much shorter (± 10 mm.) very thin bracteole which is bifid unto very near the base, with linear-filiform lobes. Just as in *A. rotunda* the bracteoles are evidently composed of two individuals.

On the whole the essential difference between the infl. of this species and *K. rotunda* is the wanting here of the two large sterile scales, forming the outer involucre.

The flower has been described several times. A few details may be added. In our specimens the exterior persisting bracts are pale green (brown Ridley) the flower tube is long, at least 40 mm (25 Ridl. and Schum.) The anther is sessile, the crest (linear Ridl., obovate Gagn.) is spathulate with a very long linear claw, the obovate tip placed just in the corolla-mouth. Ovary hairy. Fruit, often two or 3 ripening in a head, oblong or ovoid a little complanated six-striate, glabrescent, smooth, with a very thin pericarp, completely three-locular with thin dissepiments. Each cell contains commonly 4 seeds, globose, irregularly compressed, narrowed rather abruptly at the base. Arillus multi-fid, with rather broad acute linear segments, some of which are longer than the seed. Fruit 12 × 9, seed 3 mm long. The fruit is grey, with pale atropurpureus spots. The seed avellaneous.

The dehiscence of the capsule is threevalved, septifrage, the valves get loose and revolve backward; they are of a spongy consistence and soaked with water at the moment of dehiscence.

As well hereby as in the shape of the seeds there is much resemblance with *Gastrochilus javanum.*

Camptandra Ridl.

Ridley in As. S. Str. br. 1899, 103; 1907, 10; K. Sch 1904, 62. — *Kaempferia* spec Baker 1890, 223, — *Kaempferia* p.p. K. Sch. 1904, 74. — *Pyrgophyllum.* Gagn 1901, p. lxxvii.

This genus was based by Ridley principally on 3 characteris, viz: The involucrum of the in florescence. The recurvate subcalcarate, versatile anther and the fusiform falcate innumerous seeds. For the rest it resembles closely *Kaempferia*, especially *K. elegans* and *K. secunda.* In the first named the involucrum has almost the same shape, only the margins are not connate at the base, but convolute. K. Schumann has reduced to this genus two species from China described by Gagnepain, though here the anther cells are parallel not recurved and not spurred, as appears from the exact description of Gagneapain. I examined an original specimen of *C. yunnanensis,* Gagn from the Mus. de Paris 2721, and found the description of the anthers quite correct, only there must be added that the anther is versatile because of the insertion of the thin filament to the anther almost as in *Curcuma.* So this species really belongs in the genus, only the expression "*thecae semilunari-curvatae basi calcaratae*" should be struck out from the diagnose. This species relates to *Camptandra parvula* as *Curcuma aurantiaca* relates to Eu-curcuma species.

In the Herbarium bogor. I found a species of this genus collected by Teysmann in Borneo, fruiting but without flowers, which seems to accord rather well with *C. parvula* Var. *angustifolia*, Ridl. *Kaempferia gracillima* K. Schumann is a nearly related spec, only liffering by the presence of an abbreviated blade at the end of the spathe. It might be only a variety of *C. parvula.* There is a third species from Borneo in the Herb. Bog. collected by Nieuwenhuis (sterile) with erect, rather thick, stems, coated in the leafless lower part with large embracing bladeless lacerate sheaths and with subsessile, moderate, widely elliptic lanceolate leaves 3—5 approximate, embracing the nodes with their large sheaths.

Species of Borneo:

1. **Camptandra parvula** Ridl. var. *angustifolia* Ridl. (1899, 105), Hab. Sarawak, near Matang (Haviland, non vidi); Landak (Teysmann); the Teysmann specimen has thin slender ascending stems coated by fugacious sheaths. The leaves are petioled (pet. 10—20 mm.) the leaf is lanceolate or oblanceolate, caudate acuminate, mucronate with an acute very oblique, base ciliate at and near the top, 100—120 × 25—30; the conduplicate thinly membranous sheath, 25 mm. long, ends into linear, 7 mm. long auricles.

The primary bract of the inflorescence, is very acute, conduplicate and saccate, elliptical (30 mm. × 20) when expanded, it does not end in an abbreviate blade. It is terminal on a thin peduncle and projects between the sheaths and petioles of the three or four approximate leaves.

The bract includes one sessile capsule, 3-celled with *more than* 60 scobiform (not "scopiform" as has K. Schumann) seeds, 2 mm. long, fusiform and falcate with 4 thin laciniae of the arillus, as long as or longer than the seed. Bracts and bracteoles fugacious.

2. **Camptandra gracillima** (K. Sch.) Val., Hab. Sarawak near Selebut (Havil. 448, K. Sch., non. vidi.); — *Kaempferia gracillima* K. Sch. l.c.

This species seems to differ from the precedent, of which it may be a variety, principally by the abbreviated blade on the bract, the shape of which, however, has not been described.

3. **Camptandra spec.** Hab. Ulu-bluoo (Nieuwenh. 284), Sungei-bulit (Nieuw. 274) Leaves elliptic, thick, subsessile, acute, base obtuse.

Haplochorema K. Sch.

Haplochorema K. Sch. in Engl. bot J. 27 (1899) 33, 1904, 88; — Ridley Scit. of Borneo (1906), 234.

This genus, as regards the type species *H. uniflorum*, agrees with *Kaempferia* in its strictest sense by its flower characteristic, and differs by the inflorescence which is a fewflowered unilateral spike, and the pauci-ovulate sub unilocular ovary.

There are described 6 species all from Borneo which I did not see, but there are two detailed drawings of *H. uniflorum* in the papers cited. From these I gather that *Kaempferia decus sylvae* Hallier, which Schumann already suggested to belong in this genus is so like to *H. uniflorum* K. Sch. that I have little doubt they are synonyms.

The description of the ovary by Karl Schumann, ovules erect, arising from the bottom does not quite agree with that of the here described species, where the ovules are affixed (in several flowers examined) to a central axis. Evidently the reduction of the axis and dissepiments from the doubtlessly originally 3-locular ovary can reach different degrees, and I am not quite sure that the genus shall be maintained as a whole, when more and well-preserved specimens have been examined. A very striking fact may be remembered here, viz the unilocular ovary of *Curcuma Kunstleri* BAKER, see Pl. XV.) found in several flowers of different origin, while in one bud I examined the ovary was trilocular.

The following species all of Borneo belong to this genus.

H. decus sylvae (Hall) Val. = *H. uniflorum* K. SCH. in ENGL. Jahrb. XXVII (1899) 232 t 4; K. SCH. in Pflzr. (1904) 90, fig 12, except f 2. F.G. which do not belong to this species. RIDL. 1906, 233. Borneo Sarawak Batang lupar (Beccari n. 3219); m. Liang Agang (Hall. 2326 B); Matang (RIDL.)

H. polyphyllum K. SCH. l.c. Borneo, Lundu, (BECCARI Pi. Born. n. 2324.)

H. oligospermum K. SCH. l.c. Borneo, Batang lupar (BECCARI n. 3307.)

H. gracilipes K. SCH. l.c. Borneo, Sarawak (BECCARI n. 2839.)

H. petiolatum K. SCHUM l.c. Borneo, Sarawak, m. Singli (HAVILAND n. 2026.)

H extensum K. SCH. l.c. Borneo Sarawak, Batang lupar (BECCARI n. 3218.)

Hapochlorema decus sylvae, (Hall.) Val. — *Kaempferia decus sylvae* Hall. 1896. 321 tab. 27 *f* 4; K. SCHUM. 1904, 79; — *Haplochorema uniflorum* K. SCH., 1904, 90 t 89 B et 1899 232 t 4; RIDLEY 1906, 233.

As already suggested by K. SCHUMANN this species belongs to *Haplochorema*, for the ovary is unilocular in its upper part. Moreover its likeness with both the figures of *H. uniflorum*, K. SCH. is so great that I have little doubt that these species are synonyms. Comparing the figure of *K. decus sylvae* with those cited the likeness does not seem very striking, but HALLIERS fig. is drawn from the living plant and very badly too, and so the leaves seem to be ovate with an almost cordate base, but in most of the very numerous original specimens (Hall. 2326 B,) in the Bzg. Herb, the leaves are exactly like those of SCHUMANNS figures, also as to the the nerves. Moreover the leaves in these figures show a very curious insertion, they seem to be placed in the axil of an involute bract. Now in reality this bract is placed opposite (alternating) with the leaf base and envelopes the petiole with its sheathing base, on insertion which seems characteristic for the genus, rarely seen in *Kaempferia* and *Gastrochilus*.

This species has been described in a rather ample way by HALLIER, but several important details have been omitted, or related inexactly, neither his nor SCHUMANNS figure gives an idea of the stucture of the plant.

This is as follows: The stems are thin, prostrate, radicant, ("green, rubescent, in vivo") clothed with dry, lanceolate sheathing scales, *ascending* and flowering, while the creeping stolon is continued by side twigs issuing from the axils of the ulterior scales, sometimes two or more, which ascend in their turn, and form long series of small flowering herbs, distanced 30—60 mm· The ascending topend bears commonly only one large (30 mm.) ("pale green and punctate"), lanceolate-cymbiform amplexicaul scale or sheath at the top of the short (about 10 mm.) internode which represents the whole erect stem, and a few mm. above it and opposite to it the only (in 20 specimens each consisting of 1-5 herbs I never saw a two-leaved herb) petioled leaf, the leaf blade is elliptical or more seldom ovate, subacute at both ends, or the base obtuse or subrotundate shortly acuminate and channeled. There are about 4 to 8 thin erect, subparallel arcuate lateral nerves (see fig. SCHUMANN) and the leaf is glabrous with a minute hairy mucro at the top. As to the beauteous silvery-variegated colouring, see HALLIER l. c.

The petiole is 20-35 mm. long, marginated, and channeled, its basal part is dilated into a short broad membranaceous and in sicco fragile sheath, 6 mm. long and almost as broad, including the top of the stem, and itself enveloped by the sheathing scale.

By these two sheaths the inflorescence is involucrated. It is a spike with a very short and thin axis 8 mm. long, ending in a rudimental bract and bearing 3-5 flowers and flower buds each minutely pedicelled and enclosed by a semiamplexicaul bract and two thin conspicuous opposed bracteoles, 7 or 8 mm. long. Just as in *Gastrochilus* the flowers develope *from top to bottom*, and the lowest bud is still very small, while the two superior ones are decaying.

The calyx is spatho-tubiform with 3 inaequal penicillate teeth, 6 mm. long. The corolla tube 60-70 mm. long, petals, labellum, staminodes, anthers, (included in the corolla mouth and with a large petaloid recurved crest) all as in *Kaempferia*. Colour in vivo white with some orange-green stries near the base.

Ovarium oblong, 4 mm., acutely trigonous, a little compressed, glabrous, striate, one-celled in its upper part. Ovules 6-9, erect, arilled, attached to an axillar placenta ending bluntly in the middle of the ovary and connected by a very thin septum to the ovary and with two much shorter sepis to the bottom. The ovules are not as in the ovary described by SCHUMANN arising from the bottom, but attached to the axis in 2 or 3 layers. Stylodes bacillifrom 1 mm. long.

The fruit (only one among more than 50 herbs) is elliptical, crowned by the calyx with many longitudinal nerves, *oneseeded*, with several rudimentary seeds and the placenta is pushed aside by the one normal seed, which arises from the base. The normal as well as the not developed seeds are covered at their lower half with numerous erect serpentine fibres of the arill. The testa is thick, brown, the embryo elongate in the centre of the horny albumen. The fruit measures 12×6 mm., the seed 9×4.

Zingiber, Adans.

Though this genus is very well known, especially by the remarkable structure of the anthera, there are still a few points in the construction of the flower which seem to me not yet sufficiently elucidated.

There is in the first place the structure of lip and staminodes. LESTIBOUDOIS (1841, 312) the first to give a critical analysis of a *Zingiber* flower, distinguished between a flower with distinct small hornlike staminodes and an entire lip *(Z. ligulatum)* and a flower without staminodes and a threelobed lip *(Z. Zerumbet)* and in the drawing of *Z. officinale* by BENTLEY and TRIMEN (1880, 270) both the sidelobes of the labellum and two hornlike processes called staminodes between the lip and the filament are represented. These are described by K. SCHUMANN (1904,17 and 171 Fig 23). As I could ascertain by examining some flowers of the latter species, these two processes are wanting in a normal flower, and those represented in the drawing, which evidently was not made after a living flower, were certainly artificially produced by preparation. Indeed in the living flower of *Z. officinale* the lip is entire and there are two ellipsoid wholly free petaloid staminodes erect and facing the lip (not spreading as in the quoted figura.) If the faux be laid open by removing the dorsal petal and the stamen, the two staminodes find their place below the lip, overlapping the base of it sometimes *at the outer*, sometimes at the inner *side* with their margins (Pl. XV, f. 1, 2) and a little prominent at either side.

Almost the same construction is found in *Zingiber Zerumbet* (Pl. XV, f. 6, 7, 8) but there the lip as well as the staminodes are much broader and widely overlapping. Commonly the lip is called threelobed in these species but then the so called lip is really a combination of the faux with the staminodes and lip.

In *Z. Cassumunar* (Pl. XX f. 15) the staminodes are also facing the lip but they are small and the faux is rather narrow; so in the open laid flower they are placed wholly below the lip and not prominent.

In *Z. gramineum* (Pl. XX) they are very small or mostly quite obsolete, so there are only traces to be seen at the base of the rounded lip.

In *Z. leptostachyum* (Pl. XV f. 21) the staminodes seem to be wanting and the lip seems to constitute a very large widely ovate simple disk. In the living flower however the homologues of the staminodes are clearly to be recognized in its lower side parts which are erect and take the place of the free staminodes of other species.

Z. inflexum Bl. (Pl. XV f. 19) the staminodes are wholly connate with the base of the labellum, with short free tips, but by the progress of the vascular fascicles they clearly are distinguishable as unities. *Zingiber macradenia* K. SCH (= *Z. spectabile* Griff fide RIDLEY,) *Z. acuminatum* Val., *Z. odoriferum*

Blume and *Z. neglectum* Val. (Pl. xv f. 5) show different degrees of accrescence of the staminodes to the labellum.

The construction of the lip and staminodes procures an excellent charateristic for distinguishing the diverse species one from the other. Contrary to some other genera such as *Alpinia* and *Curcuma*, there are (in the Java flora) no two species which could be confused because of the resemblance of the lip.

Below I give an analytical key wholly based on the structure of tip and staminodes by which the species are easily determinated if living flowers are available.

There is still a curious teratological modification of the flower to be mentioned, which is always seen in some flowers of a cultivated form of *Zingiber amaricans*, (HEYNE 66) (see Pl. 15, fig. 16) Here the two anterior petals are fused into one and at the same time the lip which is normally distinctly emarginate or bifid at the top is quite entire. This fact seems to me to speak in favour of the theory of LESTIBOUDOIS who considers the lip as to be originated by the fusion of the two inner or petalar stamina, while according to him the outer or sepalar stamen, which theoretically ought to be inserted between the two anterior petals is supposed to have averted entirely. According to K. SCHUMANN however the two inner stamina have averted and the lip with the staminodes represents the outer staminal cycle.

Now I think that if this were the case the bilobed structure of the lip would not neccessarily be affected by the fusion of the petals, while, if each of the halves of the lip represents a petalar stamen it may be expected that with a fusion of the two petals also the petalar stamina (or labellum lobes) should get more tightly connected, as happens indeed in this anomality.

How this be the central vascular fascicle indicated by COSTERUS in several genera and representing, according to him, the last vestige of the averted outer stamen, is never seen in *Zingiber*.

The duration of the flowers in the species of *Zingiber* is, as well known, very short, it differs in the different species and, in the cirumstances observed, is constant for each one of them.

So the flowers of *Zingiber Zerumbet* begin to open before dawn but they continue to open till afternoon; so there may be found open flowers all day long.

Those of *Z. aromaticum* begin to open at eleven a. m. and when cut off they continue opening till evening.

The flowers of *Z. Ottensii* open at eleven a. m. or still earlier. Those of *Z. amaricans* (H. 66) open after one p. m; cut off, they produce only half opened flowers. *Z. odoriferum* does not open before 2 p. m. and continues till late in the evening, cut off, buds appear but remain closed. *Z. leptostachym* opens from dawn till dusk.

The pollen is globose and finely reticulate though smooth pollen is commonly considered as a character of the order.

The pollination and fertilization in this genus are not very clear, though the apparatus is apparently rather simple. But my observations are scant. In *Z. spectabile* (Pl. XVI, f. 4, 5) the long anther on the back wall of the flower is bent forward in the flower mouth in such a way that the anther top touches the patent lip at its base while the long hornlike elastic arcuate appendix is extending before it, and its top from which the downbent stigma just emerges occupies the center of the mouth, at a little distance above the lip.

Bees visiting the flowers must enforce their entrance between anther and lip, doing which they are all over covered with pollen of which they find a large store in the tube under the anther.

In retiring and leaving the flower it seems almost inevitable for them to rub some of it against the stigma. To the contrary, in some species at least (Z. *Ottensii*), the tip of the appendix is a little longer than the emerging stigma and it seems as if the intruding bee must shut the stigma mouth by pressing the appendix against it. So it seems as if the flower is constructed for auto pollination. But this is only a supposition for I did not observe the process actually.

Owing to the extremely rainous westmonsun of 1917—18, insectvisiting was scarce and I could only state that *Z. aromaticum* which opens its flowers sometime before noon was regularly visited by swarms of *Apis indica* and stray individuals of *Anthophora zonata*. Once I caught a specimen of the latter species, where the hairy ventral side and legs where covered with Zingiber-pollen, whille head and back where quite without. It is difficult to realize how it can contribute to the pollination in this way.

In this species a large proportion of the fruits ripen, though not so many as in *Z. amaricans*, where practically all flowers set fruit, as well of our garden stocks as in spikes collected of wildgrowing specimens.

In the latter species where the flowers open at 1.30 post m. I never noticed beevisiting but I suppose that it took place in the same manner on sunny hours, which, as is said, were rare, especially in the afternoon. How the many thousands of flowers could have been fertilized is a mystery to me.

In the jungle garden *Z. macradenia* and *Z. gramineum* always fruit abundantly, *Z. leptostachyum* (from Borneo) never does.

In *Z. Zerumbet* of which I observed several stocks of the most diverse origin, with its large showy white flowers which expand from early morning till night, no fertilization ever occurs and when anthesis is past the scape decays immediately and the spike is bent down. Now *Z. Zerumbet* is in Java a cultivated species since prehistorical times, while the two first named species are found in Java spontaneous or escapes, one in the teak forests, the other in waste grounds at Batavia. Both are really indigenous, while *Z. Zerumbet* is not. This may account for the difference in fruiting capacity, though not for the enormous abundance in one and the rarity of fruits in the other of both last named species.

The fruit though very common in herbaria is badly known.

I examined ripe fruits of *Z. amaricans*, *Z. aromaticum*, *Z. macradenia*, *Z. gramineum* and young ones of *Z. Lörzingii*, none of which have been described till now. All agree in the following peculiarities. (Pl. XXI f. 4—12).

They are enclosed between the bract and bracteole, both persisting, the former colouring bloodred in the uncovered part, white or hyaline in the covered ones. The fruit is elliptic or oblong, tangentially compressed, subtrigonous, threecelled, three valved, dehiscing loculicidely, with a longitudinal impression (very shallow in *Z. gramineum*) externally between the cells, i. e. in the middle of the valves, and crowned by the persistent calyx. The pericarpium is thick, in fresh capsules fleshy or more or less cartilagineous, (while turgescent) at last, by drying, leathery, as described ROXBURGH ("very thin", K. SCHUMANN). The valves are almost trigonous in the cross section because of the thick septum in the middle. The posterior one is twice as broad as the anterior ones. At dehiscing the base of the valves remains in connection with the axe, while the seeds are carried along with the spreading septs. The capsules of *Z. amaricans* and *aromaticum* are glabrous, smooth and of a pale pink colour, almost 20 mm. long, the dorsal valve 15 mm broad. The seeds are disposed in a single row, 3 or 4 in each cell.

The dehiscence is not owing to exsiccation, for the capsule is immersed in the mucilage which continues filling the bracts after anthesis. If the fruit be quite ripe, a little pression causes the opening which occurs gradually.

The capsule of *Z. gramineum* has a similar shape but is longer and more rounded with very shallow impressions 18 × 13 mm, it is sericeous, pink coloured, the two-rowed black and white seeds showing through the transparent wall. The valves are bloodred internally, longer and more spreading than in the former species.

The young fruit of *Z. Lörzingii* is oblong obovate, flat and a little concave at the backside, ventricose at the face, 45 × 14. sparsely villous, ribbed, attenuate at the top. I saw no quite ripe fruits; in the young specimens the pericarp is thick fleshy and becomes leathery by drying.

The seeds of all species are shining black entirely enveloped by a snowwhite saccate arill, open and much lacerate at the top, showing the black seedcoat.

This genus is divided by HORANINOW and SCHUMANN into three sections: *Dymzewiczia* (incl. *Pleuranthesis*) with terminal spikes, *Lampugium* with lateral erect spikes, *Cryptanthium* with lateral procumbent or very short spikes.

After what has been said (VALETON 1904) about the dimorphous inflorescence of *Z. gramineum*, the first section cannot be maintained.

Cryptanthium is represented in Java by *Z. acuminatum*, here the peduncles are very short, or if elongate they are procumbent or subterraneous and of a whitish colour. The nearest allied species however is *Z. puberulum* RIDL. which according to K. SCHUMANN is a true *Lampugium* (next to *Z. gracile*) thus the distinction between these sections is not a very sharp one.

If the structure of spikes and flowers is considered, the genus may be subdivised in a more natural way:

Group I Lampuzia. Bracts appressed, more or less convex, rarely a little inflexed in old spikes, provided with a more or less broad, more or less villous membranous margo; staminodes free or little adnate:

Subsection I *Zerumbet:* Flowers without purple mottling. Lip emarginate or bifid: *(Z. Zerumbet, amaricans, aromaticum, littorale, papuanum).*

Subsection II *Euzingiber:* Flowers yellow and purple. Lip entire: *Z. officinale.*

Group II. Inflexa: Bracts with a rounded or attenuate much inflexed upper edge, rarely appressed, commonly very convex and patent or decurved, forming open pouches. Lip emarginate or subentire, staminodes more or less adnate, flowers yellow and purple or red: *Z. Ottensii, spectabile, macradenia, neglectum, inflexum, Kunstleri, Lörzingii.*

Group III Cassumunar: Bracts ovate or lanceolate, appressed or with patent tips. Lip *orbicular* bifid or entire, staminodes much adnate, lip white or pale yellow, spikes often terminal: *Z. Cassumunar, Z. gramineum*, here also *Z. elatum* Roxb, and *Z. capitatum* Roxb.

Group IV Fusiformia. Spike more or less fusiform. Bracts ovate, obtuse or lanceolate. Lip more or less connate with the staminodes to a 3 lobed disc.

Subsection I *Calycina.* Calyx as long as or surpassing the bracteoles. Sidelobes of the lip large. Flowers purple and yellow. *Z. odoriferum, acuminatum, puberulum* etc.

Subsection II *Leptostachya*: Calyx shorter than bracteole.

This arrangement is based on malayan species, but i suppose that the asiatic continental species may be ranged into the same groups.

Key to determination of species by means of the flowerstructure.

A. Staminodes narrowed at the base, almost or quite free from the labellum.
  a. Labellum (and staminodes) atropurpureous, obovate with a rounded entire top.
    a1. Staminodes elliptic with a narrowed base. *Z. officinale.*
    b1. Staminodes ovate blunt with a rounded base. Z. *officinale. var. Sunti.*

b. Labellum white and yellowish or orange coloured, never with purple mottling, emarginate or bifid at the top.

a^1. Labellum rounded-ovate, wider than long or orbicular emarginate, faux broad; staminodes orbicular or broadly ovate, placed below the lip or very little projecting in the explicated flower.

a^2. Flowers large, pure white or cream, lip and filament often yellowish, spikes large blunt: *Z. Zerumbet.*

b^2. Flowers small, yellow with an orange coloured lip and filament.

a^3. Lip broadly ovate with a broad base. Staminodes almost orbicular: *Z. aromaticum.*

b^3. Lip orbicular, staminodes broadly elliptic or ovate. Spikes very dark brown: *Z. aromaticum* var. *obscura.*

b^1. Labellum oblong or obovate, staminodes oblong, laterally prominent (erect in the living flower). Flowers pale yellow or white, labellum yellowish, sometimes bifid.

a^2. Labellum obcordate or oblong, emarginate, unguiculate, staminodes oblong erect, narrowed at the base. Spike ovate pointed. Flowers small: *Z. amaricans.*

b^2. Labellum obovate oblong, staminodes obovate oblong. Spike at first ovate with very large sterile bracts, afterwards fusiform acute. Flowers pale yellow: *Z. littorale.*

c^2. Labellum obovate and unguiculate, bifid to the middle (in the open flower). Staminodes large, elliptic subacute quite free and clawed, erect. Flower large white, labellum pale yellow. Spike small, bracts smooth with a very narrow margo: *Z. papuanum.*

d^2. Labellum oblong, emarginate, staminodes elliptic, flowers very small pale yellow. Spike ovoid, acute, afterwards cylindric and reaching a length of 165 mm. Bracts in old spikes inflexed: *Z. amaricans, var elongata.*

c^1. Flowers large, very pale yellow, lip and staminodes very pale pink mottled with pale yellow. Lip oblong, emarginate, staminodes very large (a little shorter than the dorsal petal) obovate, erect, adnate at the base; anther dark yellow. Rhizome internally violaceous or ink-coloured. Bracts much inflexed at the top: *Z. Ottensii.*

B. Staminodes more or less connate to the labellum, either forming a three lobed labellum or almost inconspicuous.

a. Lip orbicular and finely crisped, staminodes not conspicuous or small, ovate and placed below ihe lip in the open laid flower, lip white or pale yellow.

a^1. Lip very broad, somewhat bifid at the top, cleft to the middle in old flowers, staminodes ovate acute placed below the lip: *Z. Cassumunar.*

b¹. Lip orbicular, quite entire, staminodes small or inconspicuous: *Z. gramineum.*

b. Lip ovate or oblong, not bifid at the top.

a¹. Staminodes entirely connected with the lip at their inner edge.

a². Lip quite simple, seemingly entire, pale yellow, broadly ovate: *Z. leptostachyum.*

b². Lip much narrower than the broad faux to which the staminodes are laterally adnate, with blunt short free tops.

a³. Lip pale yellow, ovate-oblong, blunt, flowers very long: *Z. acuminatum.*

b³. Lip and staminodes mottled-violet, broadly ovate, staminodes with very short blunt or acute tops: *Z inflexum.*

c³. Lip broader than long, bluntly bidentate at the top, yellow and red, staminodes rounded yellow: *Z. Lörzingii.*

b¹. Staminodes free in their upper half, forming a threelobed lip.

a². Lip violet, staminodes pale yellow. Flowers large: *Z. odoriferum.*

b². Lip and staminodes dark violet, yellow mottled.

a³. Flowers very small, lip oblong, staminodes extant: *Z. neglectum.*

b³. Flowers very large, lip ovate, staminodes erect: *Z. macradenium.*

Key for determination of herbarium.

A. Ligula 50—70 mm. long: *Z. macroglossum Val.*

B. Ligula shorter than 35 mm.

A¹. Leaves linear tapering to the top, sessile, ten times or more longer than wide, ligula very short.

a. Spikes stems etc. densely hirsute pubescent, spikes subsquarrose by the free tips of the bracts. Spike often terminal: *Z. gramineum.*

b. Spikes etc. not hirsute pubescent.

a¹. Robust herb, leaves patent, spikes large oblong conical acute, bracts rather hard, very acute, Ligula 2 mm. long or shorter. *Z. Cassumunar.*

b¹. Leaves grasslike, spike small elliptical or fusiform smooth; bracts obtuse ligula 6 mm. long, retuse: *Z. officinale.*

B¹. Leaves not linear tapering to the top, or not more than 8 times longer than wide.

a. Spikes cylindric or fusiform or ovate-fusiform, many times longer than wide.

a¹. Spikes ovate-fusiform acuminate, subglabrous bracts a little inflexed, peduncles short procumbent, ascendent: *Z. acuminatum.*

b¹. Spikes cylindric, peduncles very long, bracts not inflexed.

a². Spikes a finger thick, bracts acute. Herb glabrous. Leaves 200 × 65 or shorter, caudate acuminate: *Z. leptostachyum.*

b^2. Spikes twice as thick, bracts rounded or acute, herb puberulous or tomentose: *Z. odoriferum.*

b. Spikes elliptic or ovate or oblong.

a^1. Bracts with inflexed margin, striate, bracts of the peduncle distanced, ligula bipartite or bifid with ovate rounded lobes, 5—20 mm. long. Spikes squarrose.

a^2. Bracts truncate or broadly rounded.

a^3. Leaves linear-oblong, not tapering to the base, P = or less. Spikes 200 × 150 or smaller.
Herb glabrous or subglabrous: *Z. macradenium.*

b^3. Leaves oblanceolate-linear, tapering to the base P 5—7. Spikes 100 × 55 to 180 × 60. *Z. neglectum.*

b^2. Bracts pointed or lanceolate.

a^3. Bracts orbicular, apiculate. Spikes 100 × 70 or smaller. Leaves oblanceolate linear: *Z. inflexum.*

b^3. Bracts lanceolate apiculate, (cymbiform). Leaves large (650 × 120) oblong, Spike very squarrose, 153 × 100: *Z. Lörzingii.*

b^1. Bracts not Inflexed or only at the top. Spikes not squarrose, Ligula large, entire.

a^2. Bracts inflexed only at the top and split, rounded, for the rest margins appressed, leaves large glabrous, ligula entire very broad 10 mm., or shorter: *Z. Ottensii.*

b^2. Bracts appressed wit the entire broad margin. Ligula 15 mm., or longer.

a^3. Spikes ovate or elliptic, obtuse or subacute, sometimes oblong conical.

a^4. Leaves not very hairy beneath, mostly subglabrous, mean size 300 × 80, ligula 20 mm. long. Bracts rounded, margo broad membranous, *whitish* not *villous.* Mean size 70—90 mm. × 30—40. Varies with oblanceolate leaves tapering to the petiole, (flowers cream coloured): *Z. Zerumbet.*

b^4. Spikes mean size smaller. Bracts rounded or acute, margo narrower not whitish in sicco, villous. Mean size 50—70 but sometimes prolongate at the end of the season. Leaves subglabrous broader, meansize 300 × 90, ligula 25. (flowers orange-coloured): *Z. aromaticum.*

c^4. Spike ovate-oblong acute, Bracts acute. Margo villous. Leaves oblong-lanceolate, meansize 200 × 35, lower side of leaf arachnoideous villous, (flowers pale yellow):
Z. amaricans.

b^3. Spikes fusiform, bracts obtuse very thin, rather loose, margin narrow, leaves not surpassing 200 × 40.

a⁴. Bracts few, smooth, ligula 15 mm., or shorter. *Z. papuanum.*

b⁴. Bracts numerous, gibbous, ligula 20 mm; leaves more attenuate. *Z. littorale.*

General Key.

I. Bracts very convex, with much incurved margo, appressed to each other with the side edges, forming open pouches. In dried specimens the bracts are extant, rather coriaceous and ribbed, the spike is squarrose.
  A. Bracts with extant tips, more or less recurved, forming ovate pouches.
    a. Infl. 100 mm. tall or less; bracts rounded not very much recurved. Flowers atropurpureous and yellow. Labellum ovate with short acute sidelobes: *Z. inflexum.*
    b. Infl. 140 mm. tall, bracts lanceolate very much recurved, acute. Flowers yellow and red. Labellum very broad, rounded with short rounded sidelobes: *Z. Lörzingii.*
  B. Bracts erect with rounded or subtruncate very much inflexed uppermargo, forming semilunar or semicircular pouches.
    a. Inflorescence very large, subglobose or broadly elliptic (often 180. mm. × 150 mm.). Flowers 85 mm. long: *Z. macradenium.*
    b. Inflorescence elliptic or at last cylindric, 160 × 50 or shorter. Flowers 50 mm. or less: *Z. neglectum*

II. Bracts appressed with their margo over the entire outline, flat or convex, not forming open pouches.
  A. Peduncle rather fleshy, often short, (25—150) procumbent, ascending, never quite erect, more or less subterraneous. Spike elliptical or ovate (70—200 mm. long), pink. Flowers large quite yellow, staminodes adnate with a broad base. Bracts shorter than calyx, Ligula bilobed, with short ovate lobes: *Z. acuminatum.*
    a. Inflorescence many times taller than wide. Spike acuminate bracts rounded. Herb and bracts smooth: *Z. acuminatum, genuina.*
    b. Inflorescence large elliptical or cylindrical, (260 × 40) bracts obtuse (dried subacute) and mucronate; sericeous with a tomentose margo: *Z. acuminatum, var. acutibractea.*
    c. Inflorescence short (70 × 40) ovate or elliptic, blunt. Herb densely tomentose. Bracts hairy: *Z. acuminatum, var. borneensis.*
  B. Scape and peduncle erect, short or elongate, rarely arcuate or procumbent, not subterraneous.
    a. Inflorescence fusiform or cylindric, many times longer than wide. Bracts (dry) elongate-obcuneate acute.
      a¹. Inflorescence fusiform or ovate-fusiform very acute. Bracts coriaceous with a narrow membranous margo, acute, puberous.

Leaves linear or narrowly ovate, at least 10 X taller than wide, acute, with obtuse base. Ligula small bilobed. Labellum round, bifid to the middle. Staminodes small, placed below the lip (in the explained flower): *Z. cassumunar.*

b¹. Inflorescence elongate cylindric or fusiform. Bracts with a broad tomentose margo. Leaves elliptic or lanceolate. Ligula bilobed, lobes widely ovate (in adult plants). Lip ovate, staminodes ovate projecting laterally.

a². Inflorescence cylindrical one finger thick, acute. Peduncle often 500 mm. long. Staminodes fused with the lip, tips projecting only 2 mm. Lip concolorous pale yellow: *Z. leptostachym.*

b². Inflorescence cylindric or cylindric-fusiform, broad. Lip oblong-ovate, black purple. Staminodes large ovate projecting, pale yellow. Bracteoles shorter than calyx:

a³. Two lowest bracts of the spike (one empty) very large and conspicuously inflated. Staminodes rounded. Bracts rather obtuse mucronate: *Z. odoriferum genuina.*

b³. Two lowest bracts not very inflated, staminodes oblong acute. Bracts acute: *Z. odoriferum.* var. *borneensis.*

c³. Staminodes rounded. Bracts acute-acuminate, glabrous: *Z. odoriferum.* var. *aquosa.*

c¹. Inflorescence ovate-oblong subacute. Bracts rounded not acute with a very broad redbrown margo. Leaves large lanceolate sessile, ligula very large (2 or 3 inches). Lip pale yellow: *Z. macroglossum.*

b. Inflorescence when young ovate or widely elliptic, rarely at last elongate conical or conical-cylindric. acute:

a¹. Inflorescence at first obcuneate afterwards ovate, squarrose, pubescent, tips of the bracts hairy, extant. Leaves linear. Inflorescences lateral and terminal. Ligula very short, lobes trigonous pubescent. Lip orbicular, pale yellow, no or very small staminodes: *Z. gramineum.*

b¹. Inflorescence not pubescent. Bracts appressed without free tips, more or less convex, rounded. Staminodes attenuate or rounded at the base, or almost free from the lip.

a². Inflorescence small fusiform-elliptic; bracts of the scape often mucronate, bracts appressed without a conspicuous margo, not convex. Lip rounded, entire, atropurpureous. Staminodes elliptic with a rounded or obtuse base, atropurpureous. Ligula small emarginate, lobes with a wide membranaceous edge. Leaves grasslike: *Z. officinale.*

b². Inflorescence rounded ovate or elliptic, sometimes elongate and acute when old. Bracts rounded or subtruncate, convex with a broad, sometimes inflexed appressed margo. Two lowest bracts (one vacuous) much inflated and large. Leaves lanceolate. Ligula large very thin entire, sometimes lacerate.

a^3. Inflorescence ovate rounded. Bracts couvex and subinflated, truncate or broadly rounded above, with a broad inflexed margo. Flowers rather large (55 mm.). Lip very pale mottled pink and yellow. Staminodes, same colour, half as tall, obovate, erect, a little shorter than dorsal petal, Leaves large. Leafbase rounded. Rhizome iuternally ink-coloured. *Z. Ottensii.*

b^3. Bracts a little convex in the center, margo not inflexed or only near the top of the spike. Lip pale yellow, white or orange. Rhizome yellow or pale yellow.

a^4. Inflorescence fusiform acute, smooth, margo of the bracts rather narrow. Flowers large, pale yellow. Lip bifid unto the middle with somewhat diverging lobes.

a^5. Inflorescence elongate, bracts numerous: *Z. littorale.*

b^5. Infloresence rather small, bracts few: *Z. papuanum.*

b^4. Inflorescence subglobose or ovate. Margo of the bracts broad, conspicuous, hairy.

a^5. Inflorescence obtuse bright pale green, aftewards red, margo of bracts whitish sparsely hairy, flowers large, white, staminodes round, leaves almost glabrous: *Z. Zerumbet.*

b^5. Inflorescence obtuse olivaceous or dark brown, afterwards brown red, margo of bracts densely villous, lip orbicular, staminodes round, flowers small, orange, leaves very hairy. *Z. aromaticum.*

c^5. Inflorescence acute, olivaceous, flowers small, pale yellow, lip narrow, staminodes erect oblong quite free, leaves often very hairy. *Z. amaricans.*

Survey of species and of their distribution.

1 **Zingiber officinale** Rosc. 1807, 348; 1828, t 83; Bl. 1827, 42; Ridley 1899, 127; 1907, 30; Bentley Trimen 1888, t. 270; K. Schum 1904, 170; Gagnepain 1908, 82.

Peduncle thin, glabrous; scales appressed, glabrous, often with a small foliate mucro at their top.

Spike elliptic-fusiform (60 × 25) quite glabrous. Bracts elliptic (28 × 20) with a very small mucro, with a narrow membranous margo, lowest bract larger and sterile, but shaped like the rest, inserted 10 mm. below the spike. Bracteola as long as the bractea, elliptic (if laid out 25 × 12 mm.), acute. Calyx as long as half the tube (12 mm.) with 3 obsolete, blunt teeth. Tube

25 mm., labellum suborbicular (14 × 13); staminodes oblong with a narrowed base, almost free, suberect. Fl. yellow, labellum et staminodes atropurpureous. Herb 400 mm. tall, almost glabrous. Leaves grass-like, the longest ones 250 × 12—230 × 14. subsessile, petiole villous. Ligula broad, truncate and somewhat retuse thinly membranous but with a green area in each half.

According to Heyne (1913, 224—229) two distinct varieties are cultivated in Java, which have been described already by Rumph V—161, viz: A. the common ginger, Mal. "*haliya*", Jav. "*Djae*". B the small ginger. Mal. "*Haliya padi*", Jav. "*sunti*".

Of the latter Rumph distinguishes two forms, only one of which the "red ginger" is known in Batavia and Buitenzorg.

From both forms I was able to examine a few loose flowers and found them to differ sufficiently to distinguish two varieties. I distinguish the latter as var. *Sunti*. From none of the two I could procure a complete flowering specimen. So the following diagnose is only provisory and based on the flower only.

Z. officinale var. *Sunti*. Herba circ. 700 mm. alta, genuinae similis (rhizomate excepto); staminodia late ovata basi rotundata (in genuina oblonga, basi et apice subacuta). Labellum 15 × 13; staminodia 8 × 6.

Distribution: Not spontaneous in Java.

Outside of Java, cultivated in the tropical world; the var. *Sunti* only known from Java, Amboina and prob. Singapore (Heyne l.c.).

Growing wild in the high mountains of Western Cuba, Baker, "Economic pl. of the world".

2 Zingiber Zerumbet Sm. Exot. Bot. 2 (1804, 103), t. 112 (non vidi); Wight Icones VI (1853 t. 2003:); Roscoe Mon. Pl. (1828, t. 85); Tab nostra 17.

Trimen (1898, 259); — *Zingiber latifolium sylvestre*, Hermann Hort Ac. L.B. (1678, 637 cum tab.); — *Zingiber spurium* Koen. in Retz. Obs. III (1783, 60); — *Zerumbet Zingiber* Lestiboudois in Ann. Sc-nat. 2e ser. XV (1891, 329); — *Amomum Zerumbet* Linn sp. pl. 1753; Stickman Herb. amb. (1754, 20); — *Amomum Zingiber* Blanco, teste K. Schum. 1904, 172 (non vidi); — *Lampujum majus* Rumph Herb. Amb. V (1749) 148 t. 64 f 1.

This species was based by Linne upon Hermann, the type is therefore to be sought in Ceylon. I examined some specimens preserved in spirits, kindly sent by Mr. Petch, curator of the Peredenyiagarden and quite contrary to K. Schumann (1900, 268) I found them very different from *Z. amaricans* Bl. which only can be confused with them in a dried state, without examining flowers. Quite identical with the Ceylon specimens are living plants, flowering in the Culture garden of Mr. Heyne and in the Bot. Gardens. These were originating from the following stations:

Batavia, cult, mal. "*Lampujang gadja*" (= "elephant Zerumbet") HEYNE 67. — Djogdjakarta, cult, mal. *Lampujang*, sent by Mr. JENSEN, (cult. HEYNE, 704). — Ambarawa, Sepakung, 1000 m. in monte Ungaran, Cult. (Kds 36209 B, Oct., June.)

Timor "in sago-swamps" leg. A. O. DE CASTRO. A living rootstock sent by the collector was cultivated my Mr. J. J. SMITH in his private garden, and flowering abundantly proved to be identical with the Batavian "*lampujang gadja*".

Amboina, cult. A living plant cultivated in the Bot. garden under XI B. VI 94, collected by BOERLAGE at Amboina. Dried specimens were collected by BOERLAGE at Toelehoe, wildgrowing?

Buitenzorg in Hort Bog. No. XI B. V 71 and XI B. V 128 of unknown origin; one of these (named *Dymzewiczia graminea*) originates from the same stock, formerly cultivated in the agricultural garden, which was collected by BECCARI in 1866 and mentioned by SCH, 1c.

These numbers and V. 151 have obovate-lanceolate leaves attenuate at the base and differ thereby considerably from the cultivated type, but the flowers and bracts are identical.

The species is mentioned from the Philippines, Malacca and New-Guinea. I did not see any flowers of these. But the description given by RIDLEY in Mat. 1907,27, "lip pale yellow with an orange bar" agrees not with *Z. Zerumbet* but with *Z. aromaticum* and "lip faintly mottled pink" points with certitude to *Z. Ottensii.* Val. (see below), for in all members of the Zerumbet-group the pink colour is excluded. So the occurence in Malacca of the true *Z. Zerumbet* seems to be still incertain.

BLUME professes *Z. Zerumbet* to be found spontaneously in Java, though rarely.

TRIMEN (1898,259) gives a good description of this species, to which I shall add some details: The stem reaches 1. to 1.25 mm. Leaves subsessile elliptic-oblong, the uppermost narrower, the lower ones broader, subacuminate, very acute, with an *obtuse* or rounded base, on an average 250-300 mm. long 50-85 wide, mostly subglabrous, but never quite without some scattered appressed hairs and the very short petiole always villous. Ligula quite entire, sparsely villous near the base, 20-25 mm. long, scariose. Lower leaves 220 × 80 with an obliquely rounded base.

Scape 250-300 mm. long, 14 mm. wide, bright green (307,312 cod.) Sheaths 45-60 mm. long, the lower ones very obtuse or subtruncate, all covered with a fine tomentum, olivaceous, all with a narrow membranous margo, the uppermost with a short weak mucro, becoming inconspicuous in drying.

Spike widely elliptic or ovate and obtuse, rarely almost acute, never quite acute at the top, entirely bright green (280,287 cod.) The largest ones are 100 mm. long 50 wide. The two lowest bracts inserted a little below the base are sterile, they are larger than the rest, broader than long and very much inflate. The rest obovate with a broad rounded or very blunt upper margo and a very distinct mucro below the top, closely appressed but with a convex back. Mean size 30 × 27 or 32 × 22. The membranaceous white margo is very broad (2 mm.) and conspicous and not densely hairy, often almost glabrous, conspicuous in herbarium, the free portions of the bracts are subglabrous, the covered part finely puberulous. Flowers large (50-55 mm); white, or cream coloured, (221 and 0221, lip 216 cod.). Lip orbicular or very broadly ovate with a broad base shortly bifid or emarginate (20 × 20) not longer or rather shorter than wide with a wide somewhat crisped margin. Staminodes orbicular almost free from the lip and placed sideways and halfway facing the lip. The petals are oblongovate acute, not acuminate, the anterior ones not or very little longer than the lip; the dorsal one 20 × 13.

The anther is 10 mm long 4 — 5 broad, the appendix much shorter than the anther (7 mm).

After flowering time the colour of the spike turns into a beautiful red (11 and 6, Cod.) The bracts are however greenish at their base and striped in the middle, the free tips only are entirely red. The peduncular bracts retain their olive green colour.

In our numerous cultures the spike never continues growing while flowering, as is the case with *Z. amaricans* and with *Z. neglectum*, nor did I see any prolongate spikes in our herbarium specimens. But perhaps there is some correlation between this character and the producing of fruits, for *Z. Zerumbet* never fruits in our cultures.

The numerous specimens of diverse origin here referred though unmistakebly belonging to one species are rather varying in dimensions if the flowers are compared exactly. (see Pl. xv f 3, 4, 6, 7, 8). But in each separate stock the flowers are almost identical. The most diverging forms are that of Djocjakarta culture where the petals surpass the lip, and that of Borneo with the obovate lanceolate dark leaves. But all essential characteristics agree.

3 **Zingiber aromaticum** Val. n. sp.; RUMPH. l. c. *Lampujum minus.— Z. Zerumbeth,* RIDLEY l. c. 27. see Pl. xv f 9, 10. Pl. xvii f 6, 7.

Herba mediocris, rhizomate crassiusculo stramineo, intus pallide flavo (171 cod.) e tuberibus nunc 30 × 30 longis, basi constrictis, novellis teretibus composita. Caulis metralis. Folia brevissime petiolata vel sessilia oblonga, 240 × 55, 270 × 70, 300 × 65 subacuminata acutissima, basi attenuata, herbis adultis folia inferiora brevi-petiolata, basi oblique rotundata, supra glabra, subtus pilis parcis vel etiam densis imprimis ad costam arachnoideis conspersa. Petiolus brevissimus articulatus subglaber vel hirsutus. Ligula ad 20-25 mm. longa, integerrima, imprimis prope basin pilosula. Vagina pilosa vel glabrescens.

Scapus 400 mm. haud superans, plerumque brevior, basi 12-10 mm. crassus, roseus (3 D vel 28 D). Pedunculus intense viridis vaginis viridibus griseo-tomentosis.

Spica ovoidea vel subglobosa obtusa vel rotundata sed per anthesin saepe accrescente et demum oblongo-ovata acutiuscula, demum ad 90 × 40 longa. Bracteae virides (312 cod.) vel olivaceae, mox secus margines rubescentes obovatae margine membranaceo lato parce villoso, subglabrae. Flores inter minores, lutei (166-171 cod :), labello aurantiaco et staminodiis (161 cod.) Labellum late rotundato-ovatum latius quam longum, *basi lata* flabellato-venulosa et crispula. Staminodia orbicularia vel rotundo-ovata in flore explanato sub labello disposita, id margine imbricantia et vix lateraliter prominentia, in vivo labello opposita.

Flos 35 × 40 mm. long, labellum 12 — 13 × 15—18, staminodia ± 8 × 8 Anthera 8 × 5, apendix 7 mm. Pet, dorsale 18 × 10.

Post anthesin spicae pulchre rubrae (1 and 576 cod.) hic inde fructiferae. (vide supra.)

This description is taken principally from one single specimen, cultivated by Mr. HEYNE out of a rhizome purchased at the bazar in Batavia. The rhizome is distinguished by experts and herbmongers from *Z. amaricans* by the more fleshy consistence and apparently by some peculiarity of smell.

The spike resembles much that of *Z. amaricans*. It is however shorter and less pointed and the flowers are very different and more like those of *Z. zerumbet* by the shape of lip and staminodes (see Pl. xv fig. 9 and 10); but different by the smallness and orange coloring.

As a wild form of this species I consider the specimens collected in the teakforest of Randublatung and Kediri by Mr. KALSHOVEN, and those collected in Madura by Mr. BACKER. In both specimens the flower is orange coloured, and the lip as wide as long and not clawed, by which characters they are easily distinguished from *Z. amaricans*. But they differ as well from the type of *Z. aromaticum* by the orbicular lip and narrow (elliptic) staminodes and approach to *Z. amaricans*. Taking the orange-colour of the flower and the shape of the lip as diagnostics of *Z. aromaticum* I distinguish the following varieties.

Var. *minor* Val. Spica ovata, rotundata haud accrescens post anthesin, raro superans 50 mm. × 35, obscure viridis, marginibis albidis villosissimis pedunc. 100—200 mm. Labellum *suborbiculare* (12 × 13) vel subunguiculatum late emarginatum, staminodia orbicularia vel elliptica (9 × 4.5); flores aurantiaci. Common in the teak forests, certain javanese name "*lireh*".

Var. *obscura* Val. Herba metralis. Folia oblongo-lanceolata basi attenuata, 280 × 50—60. Pedunculus 100 × 7. Spica ovata castanea (cod. 104) 50 × 35; bracteae valde convexae margine concolore villoso. Flores luteo-aurantiaci, 35—40 mm. longi. Calyx 17 mm; corollae tubus 22 mm., labellum *suborbiculare* emarginatum vix latius quam longum, 12 × 13; staminodia late elliptica, 8 × 6.

This species was brought by the native collector Paidan from a village near Buitenzorg and is grown in the Bot. G. under XI B^5 83; vernacular name: "*Lampujang wangi.*"

Var. *pallida* Val. Herba metralis, *Z. amaricanti* similis facie spicae et colore *pallide flavo* florum, sed labello late ovato, basi latissimo non unguiculato. Calyx 13 mm., corollae tubus 22 mm, labellum 13 × 15, staminodia 9 × 6.

Form only known from a single specimen of unknown origin growing in a garden; much resembling *Z. amaricans* especially by the colour of the flowers but shape of the labellum very different. "*Lampujang pait*".

Distribution: Genuina: Cultivated in West-Java. Batavia and Buitenzorg, (HEYNE 38 and 39, from which the above description was taken), and a very near form in Bot garden XI B^5 88. from a village-culture.

Var *minor*:

Spontaneous in forest near Djasinga, BACKER 18 Feb. 1918, in the teak forests of all Java, (Randublatung, KALSHOVEN), Madiun, cult. Gemarang leg, BEUME no. 1457. and in Madura, Rapa near Sampang. 100 M, at shadowy waysides, BACKER 19753, "flower bright orange coloured". Cultivated HEYNE. 680, from Kediri.

Ambon, brought over from Java, according to RUMPH and called there "*lampujang wangi*" (aromatic zerumbet) or "*lampujang ketjil*" ("small zerumbet").

"Molucca's and Celebes," teste RUMPHIUS.

Vernacular name in Batavia and Buitenzorg "*lampujang wangi*" which is distinguished by expert natives from "*lampujang ketjil*" (or „*lampujang pait*"). The wild form however is always called "*lampulang pait*" or "*prit*" in Buitenzorg and "*lireh*" everywhere in Java.

Malacca: RIDLEY sub *Z. Zerumbet* Sm.

Zingiber amaricans Bl. Enum. (1827, 43). (Pl. XV f 14, 15, 17.)

This species is nearly related to *Z. Zerumbet*; SCHUMANN could not distinguish them in his study of the type specimens in the Leyden Herbarium. The two species have in common the rounded or very obtuse rather dense bracts with broad membranaceous and hairy, strongly appressed margins, while the bracts themselves are a little inflated or convex below the top which is provided with a short mucro. In dried specimens indeed the resemblance is rather great and herbaria specimens of *Z. amaricans* are doubtlessly often confused with those of *Z. Zerumbet.*

The difference between the two is however more considerable than the analogies, and I consider them as two distinct species.

The following descriptions of two rather different varieties are taken from two plants grown in the culture garden of Mr. HEYNE under H 23 and H 66, the first of which I consider as the type.

Z. amaricans Bl. Herba inter minores. Rhizoma consistentia durum intus flavum, extus pallidum, caulis basi vulgo pallide rubra. Folia oblongo-lanceolata iis *Z. aromatici* vulgo angustiora basi in petiolum hirsutum brevissimum attenuata nunquam rotundata vel obtusa, ceterum Z. aromatico simillimum, nunc 225×38. Scapus brevis (100—200 mm.×7.) viridis; vaginae olivaceae et rufae; spica ovata acuta 70+30 vel brevior. Bracteae obovatae vel subor biculares concavae, superne rotundatae vel obtusissimae virides merginibus villosis appressis demum subinflexis, apice mox roseae demum rubrae (1 et 2 cod). Flores parvi *pallide flavi* (171—198 cod.) petala 0171. Labellum *oblongo-obcordatum unguiculatum*, staminodia oblongo-ovata *unguiculata*, in vivo erecta et labello opposita. Flos 38—42 mm, tubus cor, 23 mm., cal 13 mm. Petala anteriora anguste oblonga acuta, labellum superantia. Labellum 12 × 10, ad 2—3 mm. apice incisum lobis obtusis divergentibus; staminodia 6×4. Anthera appendice pasullum longior.

Z. amaricans var. *elongata*. Pl. XVII f 1—5.

Herba mediocris. Rhizoma precedentis. Folia 310×45 vel 270×55 (P = 5-7), minora 190×40, subtus arachnoidea. Ligula 30×14.

Scapus 200×10, vaginis brevibus laxe pilosis olivaceis, axi intense viridi (307 cod.)

Spica ovoidea acuta, 75×37, 90×40, 115×45, per anthesin valde accrescens demum cylindrico-ovoidea 160×50 vel 165×60. Bracteae obovatae apice late rotundatae, demum fere subtruncatae, *valde convexae*, circ 26×20 longae, obscure olivaceae (205-180 cod.) per anthesin mox rufescentes, demum pulchre *rubrae* (1-3 cod.). margo angustus (1 mm.) pilosus et ciliatus, primo albidus mox rufus.

Flores parvi, pallide flavi (178 D et 198 cod.)

Labellum *ellipticum vel subobovatum* basi attenuatum apice ad 1/4 incisum, staminodia *oblongo-elliptica*, erecta labello opposita, plane libera. Petala stamine et labello multo longiora apice attenuata.

This variety is very characteristic by the extremely long growing spike, unto 165 mm; and abundantly fruiting. It differs from the type by the somewhat larger flowers, and less, attenuate staminodes.

Z. amaricans, var. *fuliginea*.

Z. aromatico var. *obscurae* similis sed floribus pallide flavis, labello valde unguiculato et staminodiis oblongis cognoscenda.

Distribution: West-Java: Batavia and Buitenzorg, cult. HEYNE C. 23 and C. 66. Vernac. name "*Lampujang pait*" (= Bitter Zerumbet) and *Lampujang prit* or *ketjil* (= small *Zerumbet*). RUMPH does not mention the name *"lampujang pait"*, but he uses "Lampujang ketjiel" as a synonym of *"lampujang wangi"* (see *Z. aromaticum*).

Batavia Westside Halte Duri on uncultivated grounds, where Salacca-palms are grown, spontaneous or perhaps escaped from since long abandoned cultures.

Bivak Denu (Tjipatudja) BACKER 8903. Determination uncertain (flowers and notes being wanting)

South-Pekalongan, Lebak barang, BACKER num. 23499.

Tomo, Soemedang 150, M. in teak forests very common, Kds 42696 "flower pale yellow, fruit red pedunkel 250—350 mm." (Determination uncertain)

Madura, Bangkalan, Waste places in villages, BACKER 18939 "flowers bright yellow."

5. **Zingiber littorale** Val. *Z. Zerumbet* Sm. var. *littoralis* Val. Ic. Bog. t 250. — *Z. perakensis* King and Pr., msc. in Mus Perak in Herb Bog Wray 3549 — *Z. amaricans* Bl., HOLLRUNG 446 in Herb. Berol:

This species has not been collected flowering recently, so I can not give new details about it. It differs from *Z. Zerumbet* and other allied species by the shape of the spike (fusiform), the thin membranous bracts with a narrow inconspicuous margo, the uniform pale grey colour of the dried spikes, the low stature (stem 600 mm, leaves 240 × 50). The flowers apparently resemble those of *Z. amaricans* Bl., and these two species ought to be compared again with fresh specimens.

Distribution: Java, Poeloe Merak 10 M, legit VAL. (type specimen) and BOERLAGE.

Sumatra Sibulangit 500 M., LÖRZING 1378 "Herb, 700 mm. high, leaves 100 — 300 mm. long, × 25 — 80. Peduncles ± 200 mm. Bracts green, with a membranous edge, appresed, smooth. Flowers yellow and white, labellum lemon-colour in the center, bifid to the middle".

Malacca, upper Perak WRAY 3549.
Nova-Guinea, HOLLRUNG 446.

6. **Zingiber papuanum** Val. n. sp. Tab. nostra XVIII.

Herba parva nunc debilis. Caulis circ semimetralis, basi circ 7 mm. versus apicem 2 mm. crassus, tenuiter sericeus, fusco-olivaceus. Rhizoma tenue e membris obovatis compositum, intus pallide flavum.

Folia lanceolata, subacuminata, acutissima, basi in petiolum brevem (4 — 5 mm.) marginatum decurrentia, majora 190 — 230 × 57 — 50, minora 115 × 30 — 42, subtus parce pilis appressis conspersa. Ligula rotundato-ovata supra saepe retusa 5 — 10 mm. longa alba.

Scapus gracilis nunc 150 × 5 mm. alta squamis 4 vestitus, 40 — 30 mm.

longis, brunneo-rubris (58), infimis albidis. Squama summa minor (25 mm.), bracteis spicae opposita, olivacea. Scapus cum squamis pubescens. Spica elliptica attenuata sive brevi-fusiformis, basi et apice attenuata acuta, 35×17 — 60×20 mm. longa, laevis, haud bullata. Bracteae rotundato-obovatae, margine angusto ($^1/_4$—$^1/_2$ mm.) albo, in sicco conspicuo, magis minusve incurvo, mucrone minuto subinconspicuo, pubero, ceterum basi excepto glabrae, laeves, tenues, striatae, in vivo virides, superiores prope apicem pallide purpureae. Exterior singula cassa, villosula magis bullata. Bracteola latiuscula (25×15) glabra. Flores inter majores, albi, labello medio pallide citrino, anthera circ. (171), 45—54 mm. longi (tubus 34 mm.). Petalum dorsale acute ovatum, 24×9; lateralia angusta, acuta, 20×3, ad medium connata. Labellum suborbiculare basi unguiculatim attenuatum, apice in flore adulto fere medium usque incisum 16×14, lobi semiovati paullum divergentes, Staminodia elliptica vel rhomboidea acutiuscula unguiculata a labello tota libera (12×6).

Habitat: Nova Guinea in partibus borealibus.

This rather small herb was several times brought over from North-east-Newguinea. It shows a rather feeble growth in our cultures. (Garden-numbers XI B^6 3, 33 and 136). It is conspicuous by the creamwhite flowers which are almost as large as the spikes and a little oblique, the large unguiculate staminodes, and the deep bifid labellum, therein equalling). *Z Cassumunar*. For the rest the species has much in common with the zerumbet group, especially with *Z. littoralis*, by the bracts and the free staminodes, which are longer-clawed than in any other species.

7. **Zingiber Ottensii Val.** Tab. nostra XIX.

(*Zingiber sp.* Griff Notul. III 412, Ic. t 351. — *Z. Zerumbet* Ridl. 1907, 27 p. p.)

Herba robusta sesquimetralis, rhizomate intus atroviolaceo. Caulis subglaber, 8 mm crassus dense foliosus internodiis brevibus. Folia (340×80) subsessilia, elliptico et oblanceolato-oblonga apice attenuato-acuminata, acutissima versus basin saepius angustata basi rotundata, supra glabra dorso subarachnoidea, petiolo brevissimo dcrso hirsuto. Ligula integerrima apice subacuta, brevis lata 15 mm. longa, 13 lata, tenuiter membranacea, glabra vel subglabra cum margine lato vaginae continua. In planta juvenili folia lanceolata acutissime acuminata basi attenuata 230×40, ligula minore 5—8 mm. longa, Spica magna ellipsoidea obtusa vel acutiuscula, 90 mm. longa, 45 mm. lata; vel etiam majot in vivo bullata. Bracteae dense imbricatae et applicatae, valde convexae et apice profunde incurvo non autem saccatae, obovatae vel inferiores sub-orbiculares, apice subtruncatae margine brevi, tenui, scarioso applicato, in sicco parum conspicue, tenerrime pillosulae, imprimis ad margines, 40×(30-40).

Flores majusculi (circ. 50-65 mm.) Bracteola (30×16) tubo paullum

brevior, calycem totum includens, convoluta et valde complanata apice constricta et subbifida. Calyx (explanatus) late ellipticus, 20 mm longus 14 mm. latus, apice truncatus (6 mm latus) et subretusus vel bidenticulatus, nervo mediano distincto in sinum desinens, nervis numero 11 (3 in medio 4 im utraque parte). Corollae tubus 35 mm, apice dilatatus; pet dorsale ovatum (25 × 13) obtusum et subcucullatum nervis 7, laterales ovato-oblongi (20 × 6) in vivo patentes subrigidi et decurvi, labello breviores.

Labellum oblongum apice rotundatum et breviter acute emarginatum, in vivo fornicatum patens petalis sustentum (tum specie ovatum bilobum), 21 × 15; Staminodia magna obovata, apice rotundata (15 × 9) in vivo erecta et labello subopposití, in flore explanato labelli basi adnata. Stylodia 9 mm long.

This interesting species, different from all known species of the genus by the internally violet or ink-coloured rhizome, was discovered by Mr· OTTENS [1]) in a village near Buitenzorg where it is cultivated. It is known as "*banglai-ideung*" or "black Cassumunar" and the natives distinguish it thus from all forms of the Zerumbet group, which always are called „*lampujang*".

It resembles however *Z. Zerumbet* in a general aspect and I presume that GRIFFITHS figure t 351 of a Zingiber sp. cited by RIDLEY as *Z. Zerumbet* really refers to *Z. Ottensii.* The structure of the flower in all the figures is very different from that of *Z. Zerumbet* (compare e.g. WIGHTS Ic. t. 2003 f 1 and 2) and strikingly resembles *Z. Ottensii.* GRIFFITH calls the flower "ochroleucos", a rather vague term to me, but according to SACCARDO, fig 28, it much more resembles *Z. Ottensii* than *Z. zerumbet.* By all means the colour of the flower of *Z. Ottensii,* a very faint pink densely inspersed with large and small pale yellow spots, is very characteristic and never occurs in the zerumbet group. *Z. Ottensii* does not belong to this group but to the *spectabilegroup,* where the colour is mixed up of violet or lilac and yellow.

The bracts in this species are brownred from the beginning (53-58 or 88 Cod. = badius and latericius), SACCARDO, (19 and 20), and become bright red after flowering (76). The flower is very faintly orange coloured (between 0171 and 171), the connective 166. The flower is 50 — 65 mm. long, the lip with the faux 25 — 30 mm. The large staminodes are obovate (15 × 11) and a little adnate to the base of the lip. The broadly oblong labellum is rotundate and a little emarginate. The bracteole is as long as the tube, 35 mm, and tinged reddish at its top. The same species was recently discovered by LÖRZING in the newly broken up grounds of the botanical garden of Sibulangit. His detailed description of the living plant agrees perfectly with ours, only the rhizome is described as internally "red-violet," the younger parts "pale pink".

---

[1]) Mr Ottens to whom I am glad to dedicate this species is assistant in the Museum for technical Botany and has applied himself much to procure for me materials for this study.

Distribution: Java; near Buitenzorg 300 M, cultivated.

Sumatra, Sibulangit spontaneous in light forest, 500 M. (Lörzing 5213).

Malacca, Pungit maj. Griffith, Ridley (vide supra.).

8. **Zingiber Cassumunar** Roxb. 1810, 347 tab. 5 (non vidi); Roscoe 1828, tab. 85; K. Schum. 1904, 179; Gagnepain 1908, 84; Ridl. 1907, 28; Heyne 1913, 190. Rumph 1749, 154.

Spike fusiform or cylindrical ovate, acute, 100—160 × 30—35 mm. long. Lowest bracts almost round, the mean bracts obovate lanceolate *acute* Free parts rhombiform, sericeous, top and margin tomentose. Bracts densely imbricated not convex. rather coriaceous.

Labellum white, large, suborbicular, with a somewhat crisped edge, profoundly incised, almost to the middle in old flowers, at last split almost to the base. In newly opened flowers however only emarginate. Staminodes ovate subacute halfway adnate to the base of the lip, not prominent sideways in the open laid flower. In the Javanese plant lip and faux 20 × 18, in the Sumatran ones lip and faux 30 × 25.

Leaves sessile linear-lanceolate or oblong-lanceolate acute with an obtuse base, 250 × 20 — 350 × 30 mm. long, glabrous except the back of the costa which is puberulous and pilose at its base. Ligula very short, truncate puberulous.

Distribution. The species is cultivated in Java from the plain unto 1300 M. in the mountains. In the Bzg. Herb. I found specimens from Batavia (Ploem 1863), from Bzg. (Heyne 13). from Takoka. 1200 M. Kds 33378 B. Ngarengan Djapara Kds 35533 B, Sepakung (Semarang) 1300 M. Kds 36207 B, all cultivated. It was also collected in teak forests in Kediri (Kalshoven 1917), where it is perhaps spontaneous. Vernacular name "*Banglai*," or "*Panglai*" sund., "*Bengle*" Jav., no other local names.

Outside of Java.

Sumatra: Sibulangit, light forest at 500 M., Lörzing 5214. "Bracts much appressed, plane, brightbrown, uppermost 1/3 part dark greenish-brown, near the margin brightgreen, margin membranous, pale brown. Calyx bright red brown, corolla pale yellow. Rhizome internally pale flesh-coloured, the cortex more yellow, with an acrous smell."

Amboina, Rumph. cult.

Coromandel and Bengal, spontaneous (Roxb l. c.)

Malacca cult. and an escape in waste grounds, Ridley 1907, 28; Cochinchina cult., Gagnepain l. c.

Ridley cites as a synonym *Amomum montanum* Koen. (Retz 1779, 52) "species habitans in sylvis opacis montosis siamensibus", but Koenings very exact description of that species disagrees with the present by the following important points:

"Folia petiolata, ovata. Bracteae rotundatae. Bracteola calyce aequilonga tubo corollae duplo brevior. Labellum ovatum acutum, planiusculum, basi utrinque bilobum, maculis et lineis sanguineis pictum. Filamentum coccineum. corniculum purpureum." To me it seems impossible that KOENING could have meant *Zingiber Casumunar* by this description. Regarding the shortness of the bracteola it must be related to *Z. odoriferum* Bl. and *Z. acuminatum* Val. In all other species known to me the bracteola equals the corollatube, at least to 2/3 of its length.

9. **Zingiber gramineum** Bl. 1827, 45; GAGNEPAIN 1908, 81; — *Z. elatum* Bl. l. c? K. SCHUM. 1904, 175; — *Z. elatum* (an Roxb?) Val 1804, 7; — *Z. alliaceum* K. SCH! l.c. (non *Donacodes alliacea* Tet B, quae est *Hornstedtia alliacea* Val.). Tab. nostra. XXIII.

The two forms described by BLUME as *Z. gramineum* and *Z. elatum* are probably not specifically different as already suggested by K. SCH. Whether they really are identical with the Roxburghian spec. as I accepted in my former paper (and I think it still most probable) is not to be decided with absolute certitude. But the plant depicted by ROSCOE as *Z. elatum*, considered by BAKER as a variety of *Z. capitatum* Roxb does certainly not resemble *Z. gramineum* Bl.

HASSKARL (1843, 122) considered *Z. elatum* Bl. and Roxb. as a top-flowering variety of *Z. Cassumunar*, a modification he says, often occurring, and does not mention *Z. gramineum* Bl. But I saw in Leyden a specimen of the bot. gard. of Calcutta (with a lateral scape) named *Z. elatum* and this resembled very much *Z. gramineum* Bl. This specimen was determined by K. SCH. as *Z. alliaceum* K. SCH. and agrees with his scanty description of that species and of *Z gramineum* Bl.

GAGNEPAIN (1908, 81) gives a good description of *Z. gramineum*, but he did not see terminal inflorescences, which are not uncommon in the Java plants if grown from seeds, nor did he know the flower. I therefore shall add a few details and a drawing of this species:

Inflorescence long pedunculate now terminal on a foliate stem, now lateral on a sheathed scape, young *obovate* and enclosed by the two large oppressed empty bracts, accrescent and becoming broadly ovate, blunt. Bracts elliptic (30 × 14) or elliptic lanceolate thinly pilose with a much narrowed curved penicillate tip, loosely imbricate with free patent tips. Bracteoles as long as the bracts (28 × 10 mm.) and similarly shaped but narrowed and with an acute not acuminate top, pilose. Flowers small, white, 35 mm. long. Labellum round (15 — 15 × 17) quite entire, pale yellowish. Staminodes obsolete or very small, elliptical, white, facing the labellum in the living flower and adnate to its lower edge and placed below it in the open laid flower. Dorsal petal ovate acute (15 × 6) anterior ones oblong acute, adnate at the base. Tube 25 mm. Calyx half as long as the bracts (18 × 8) blunt; ovary pubescent, capsula enclosed by the bract and bracteola, rufous appressed-hairy, 18 mm. long, 15 broad, brownish-red. Valves red internally.

Leaves bright seagreen. Flower light yellow. Petals often pinkish.

Distribution. In Java: This species is never cultivated. The citation of RUMPH by BLUME and the name "*lampujang wangi*" are wrong.

It is a constant inhabitant of the teak forest of central and east-Java vernac. name "*lireh asse*".

In West-Java specimens were collected at Buitenzorg in bamboojungle, numerous collectors; sund. name "*ella*". Klapa Noegal, 200 M. (BACKER 5867, "pale yellow flower"); Tjiloa, Zandbaai, 10 M. in shrubby jungle (BACKER 995); in central Java: Nusa kembangan ("light-forest", nat-coll), Randublatung (KDS 42255 B, KALSHOVEN 1608), Kediri (Kalshoven).

Outside of Java: Cambodge, Cochinchina, GAGNEPAIN l.c.

There may be distinguished a smaller, genuine, and a more robust form (forma *validior* K. Sch). In the first the spikes, often terminating foliate stems 1,5 M. tall, are sessile between the somewhat approximated upper leaves, with a rather small number of bracts; in the latter the scape of the lateral spikes is 300—500 mm. to 1 meter long, the spike fusiform-ovate, 75 × 25—90 × 45, with very densely imbricate bracts. Here the staminodes though small were very obvious, white, facing the labellum and adnate to its basal edges.

The leafstems here are sometimes 2 M. long, the leaves reach a length of 450 × 38. The scapes often bear short leaves.

10. **Zingiber leptostachyum** Val. Ic. bog. t. 275 (1908).

This species has a superficial resemblance to *Z. gracile.* Jack. but it differs manifestly by the shape of the labellum which is entire broadly ovate, with very short rounded sidelobes (adnate staminodes). Pl. 15 f. 21 In *Z. gracile*, according to RIDLEY, the lip is lanceolate, acute and deeply bifid, while the sidelobes are oblong and 12 mm. long.

It is also curious by the absolute wanting of pubescence. In a living state the habit is rather different from other species by the short bright green leaves (180 — 200 × 60 — 65), much more reminding a *Globba* than a *Zingiber*. By the same characteristic and by the shape of the leaves it differs from *Z. stenostachys* K. Sch. from Borneo.

Distribution: Borneo centralis: NIEUWENHUIS sine no.

Amai-ambit HALLIER B. 3442.
Liang Agang HALLIER B. 2776.

With *Z. acuminatum* and *Z. odoriferum* it forms a group characterized by the short bracteola, which in all other species here mentioned is much longer than the calyx. These species have also rather narrow more or less cylindric spikes and more or less elongate peduncles.

11. Zingiber acuminatum Val. (1904) pag. 13, 1905 (Tab. 171) p. 249.

This species has been collected in different places in West Java at the feet of mountains.

Describing this species at first I did not know RIDLEY's description of *Z. puberulum* (RIDLEY 1899, 130 et 1907, 29), with which it agrees in many aspects. Differences are the brown fur of the leaves etc, the shape of the spikes (fusiform), the lanceolate bracteole, the erect peduncles of that species. Perhaps it is to be considered as a variety of it.

There are other forms in our herbarium which though according with the type in some cardinal points are rather different in other aspects. They are here considered as varieties. So we get the following diagnoses.

Z. acuminatum var. genuina.

Herba subglabra, 3.5 metralis, caule villosulo. Folia elliptico-oblonga, 330 × 100, petiolo usque 10 mm. longo. Ligula 3 — 4, prope basin caulis 7 — 10 mm., profunde retusa, puberula ad basin. Spica ovato-vel elliptico-oblonga, acuminata, ad 150 mm. longa, bracteis sub apicem inflatis, apice margine inflexis, appressis, laete roseis, 40 × 35. Bracteola 28 × 8, acutiuscula, oblonga. Flos pallide sulfureus. Calyx 30 × 12. Corollae tubus 40 — 45 mm; lobi 30 et 25, labellum 28 mm × 25, lobo mediano 15 mm. longo ovato-oblongo apice truncato, subretuso, lateralibus ad 4 mm. liberis suberectis. Anthera 13 mm, crista paullo brevior.

Stigma parvum cupulare, margine longiuscule setoso-ciliatum; ovarium hirtellum. Capsula trigono-oblonga 25 × 12.

Distribution.

In West-Java, endemic,: Salak leg. VALETON 800 M; G. Karok near Djasinga 400 — 600 M, BACKER 10376; Pasir Kempul near Nirmala 1200 M, BACKER 11104.

12. Zingiber acuminatum var. borneensis Val.

Herba mediocris, pubescens. Folia subsessilia usque 280 × 86 mm, vulgo minora, elliptico-vel obovato-oblonga acutissime attenuato-acuminata basi cuneata, basi costae petiolatim incrassata, supra glabra subtus puberulo-tomentosa secus costam dense pubescentia, pilis tenuibus sub-accumbentibus. Ligula brevissima truncata angulis obtusis auriculatis hirtis.

Spica, 50—100 mm. longe pedunculata, pedunculo tomentoso, dense imbricato, late elliptica vel ovata, circ. 75 × 35 mm. longa vel minor, gibbosa, bracteis oblongis rotundatis appressis medio sub apicem convexis, margine tenui villosissimo, medio apice inflexo, 40 × 22 mm. longis.

Bracteolae lanceolato-oblongae acuminatae, calycem longitudine haud superantes (23 mm. × 6).

Calyx tener apice angustato-truncatus, corollae tubo 1/3 parte brevior. Corolla concolor pallide sulfurea 60 mm. longa, tubus 35 mm. longus. Labellum trilobum late ovatum 25 mm. circ. longum, lobo mediano *ovato-oblongo* apice subretuso, lobi (staminodia lateraliter adnata) late ovati apice truncati, parte libera circ. 4 mm. longa, erecti, in flore explanato lobo mediano paralleli. Stamen 25 mm. longum, anthera et crista aequalibus. Petala lateralia labello longiora, dorsale stamen aequans.

By the sooty pubescence of all parts, by the small elliptic spikes the shorter flowers and bracteoles the broader sidelobes of the lip, the shorter stature and leaves and the very short ligula, this form differs from *Z. acuminatum*. Still both have in common so many characteristics: habit, shape and colour of bracts and flowers, general shape of labellum etc, bracteoles shorter than calyx, that I consider them as varieties.

Distribution: Borneo centralis leg. NIEUWENHUIS. Cult. in Hort. bog. XI B^5 141 (rarely flowering).

13. **Zingiber acuminatum** var. acutibracteata.

Herba bimetralis puberula. Folia subsessilia oblongo-lanceolata subtus imprimis ad costam puberula. 380×60. Ligula brevissima truncata subretusa, lobis (angulis) trigonis ciliatis.

Spicae modice pedunculatae saepe maximae, cylindricae vel ellipticae obtusissimae, 100 — 200×40 — 50 mm, pedunc. 50 — 150 mm. longo crasso, sericeo, squamis oblongo-ellipticis vestito; bracteae dense ovatae in vivo obtusae, sub apice minute mucronatae haud inflexae, in sicco acutae, parte libera subrhomboidea acuta, sericeo-puberula, membrana crassa tomentosa marginatae.

Flowers are wanting.

“Spike not much above the ground. Red upper part of the bract obtuse with a mucro below the top, the bracteole is transparent pale pink 35 mm. long. Ovary 5 mm. long. Calyx hyaline, membranaceous, pink at the top, 30 — 35 mm. long. Corolla 60 — 70 mm. long, pale sulfureous, petals 25 mm. Labellum broadly trigonous, 3-lobed, obtuse or retuse, pale sulfureous. Crest of the anther 14 mm. long”. (BACKER).

This form must be considered either as a variety of *Z. acuminatum* or as a vicariating species. BACKER, who collected it, took it for *Z. acuminatum*. The shape of the spikes however is very different and as far as can be concluded from the dried material, the bracts apparently are not inflexed and gibbous at the top. Moreover the leaves are narrower, the ligula is much shorter and the pubescence denser.

This form, as well as the var. *borneensis*, agrees in many points very well with *Z. puberulum* Ridl, there however the pubescense is brown coloured.

Distribution: Pekalongan, Roseredjo 1500 M., Backer 16228; G. Wilis, (above Kediri) 1200 M, Backer 11493, "Forest"; G. Wonosegoro (Wilis) 1700 M, Backer 11515.

14. Zingiber odoriferum Bl. (1827) p. 44; Valeton (1904) p. 6; (1905) tab. 175. — Z. *aquosum* Bl. l. c.p. 43. Kuhl et v. Hasselt, Icones ineditae.

Lofty herb. Leaves subsessile oblong or linear lanceolate rather variable, arachnoid-pilose on the back side, varying between subglabrous and densely villous. Ligula bipartite to the base, lobes now very short, now, in older parts, unto 15 mm. long, ovate, more or less tomentose. In young leaves always very short. Spike on a very long peduncle (400 mm. to one M), erect, at last more or less overhanging, with rounded mucronate scales; cylindric fusiform, obtuse or acute. Bracts much appressed, obovate or lanceolate, rounded at the top or very acute, mucronate below the top tomentose or quite glabrous. Flower 60 mm. long, pale yellow; labellum; dark purple. Calyx spathaceous and much inflated above the middle, a little *longer than the short bracteole*, 1/6 shorter than tube, acute. Lobes large very acute, the lateral ones patent and projecting. Labellum broadly or oblong-ovate, retuse or subentire, dark purple with yellow spots. Staminodes, ovate, *yellow*, adnate, free for 1/2 of their length, patent, rounded or denticulate-truncate, rarely acute.

This species only known till now from mt Gedeh and from Borneo (erroneously Sumatra in my former publication) has now been collected at many places in West-Java and Nusa kembangan from 300 — 1600 M. and proves to be most variable as to the shape of the leaves, labellum, and pubescence. Farther east than the Kinderzee it has not been found. It has not been found neither in Malacca nor in Sumatra.

Common name in West-Java "*belacatoa*", sometimes "*tongtak*". The latter name belonging more constantly to *Z. inflexum* and *Z. neglectum*.

I distinguish the following varieties:

var. 1 genuina. Spike blunt rather broad, bracts with an obtuse or even rounded rarely subacute top, mucronate, puberulous with a villous margo. Lowest bracts large. Labellum (middle-lobe) as broad as tall (15 mm.); staminodes rounded, stylodes 6 mm. long, subulate. Probably in all mountain forests of W. Java.

a *tomentosa*. Leafbackside and ligula densely villous, bracts tomentose.
Pasir Walang near Nanggerang 1050 M. Backer 8712.
Nusa kembangan 300 M, Valeton 174.

b *glabrior*. Leafbackside sparsely arachnoid, bracts subglabrous:
Mt Gedeh, Tjibodas 1500 M, several collectors.
Mt Gedeh northside in Schima-forest, Backer 21528.
Boerangrang 900 M, Backer 14138.
Tjikukur 1600 M, Backer 12898.

Nirmala 1100 M, Backer 10905.

Mt Sesepan (near Buitenzorg) Scheffer 3 Oct. 1870.

var. 2 *aquosa;* Spikes and leaves entirely glabrous, bracts very acute. Labellum very broad.

Mt Salak, Tjiapoes 500 M, Hallier.

Pasir pogor 1000 M, Backer 9141.

Bodjong manis. Banten, 200 M., Kds 41027.

var. 3. *angustifolia.*

Leaves sessile, 9 — 10 times longer than broad (600 × 60), arachnoid, bracts obtuse, mucronate, puberulous. Labellum much longer than broad 18 × 13. Staminodes short and rounded.

G. Beser (Tjibeber) 1300 M leg. Smith 722 and Backer 22399.

var. 4. *borneensis.* — *Z. gracile*, Gagnepain msc in Herb. bog. (not of Jack).

Resembling very much the genuine form but spike narrower and acute, labellum ovate (18 × 15) and staminodes acute, stylodes very long, 13 mm., filiform. Borneo, Teuscher. Cultivated in the bot. gardens, sub XI B^3 27, and XI B^3 39, 59, the latter of unknown origin.

15. **Zingiber inflexum** Bl. 1827, 43. Val (1904) 7; 1905 tab 172.

This species has been collected now in several places in West and Mid-Java though rather rare; from Malacca it is not yet mentioned. There is a specimen in our Herb. from the mus. Perak, Wray 3518, from upper Perak, which was determined by King as *Z. inflexum:* the specimen however is indeterminable and may belong to *Z. Kunstleri.*

The species has been collected in the following places:

Tjibodas in Mt Gedeh 1500 M, many collectors.

Nusa kembangan 300 M, Val. 107.

Sendoro 1650 M, "in shadowy young forest". „Scape 250 mm with the spike, spike red, rhizome tasting of terpentine, vernacular name "*Peseot*". Lörzing 370.

Madjenang 30 M, Backer 18545.

Vern. name "*Tongtak*" Tjibodas, "*Peseot idju or Penseot*" on Mt Sendoro (Lörzing).

16. **Zingiber neglectum** Val. 1904, 9; 1905 tab. 174;? *Z. tongtak.* K. Schum. 1904. This species is very difficult to distinguish from *Z. inflexum* in a dried state if the preservation of the materials be bad and I am not quite sure that this is not the real *Z. inflexum* Bl., for the expression "*subcarinate*" in the diagnose is perhaps better according with this species than with my *Z. inflexum*, where they are rather "*carinate, deflexed*", than subcarinate. If I had discovered this species first, I should most probably have called it *Z. inflexum* Bl. Happily the original specimen is too bad to make probable a discovery of the supposed error.

Even in a living state the young spikes of *Z. inflexum* may be confused with *Z. neglectum;* but they are easily to be distinguished seeing that the open pouches of the bracts have an oval mouth in *Z. inflexum* and a semicircular mouth in *Z. neglectum* as in *Z. macradenia*. In old spikes the bracts of *Z. inflexum* have patent deflexed tips, in *Z. neglectum* these are erect; moreover the old spikes of *Z. neglectum* are cylindric and sometimes reach a length of 160 mm. × 50, while those of *Z. inflexum* are rarely much longer than wide. This character is also available for dried materials. The leaves are in both species narrow oblanceolate or oblong lanceolate, tapering to the base into a very short channeled petiole, only a little narrower in *Z. neglectum* (P 6 × 7.5, while in *Z. inflexum* P 5 × 7). For determination this character is of no use. The main shape of the bracts taken apart is the surest means of distinguishing the species in doubtful cases, in *Z. neglectum* these are truncate or faintly rotundate, in *Z. inflexum* they are rotundate and somewhat obliquely acuminate.

Good outgrown spikes of *Z. neglectum* may also be confused with small ones of *Z. macradenia*, but here the shape of the spikes, cylindric in *Z. neglectum*, globose in *Z. macradenia* and the twice as tall flowers of the latter furnish an easy distinction.

Z. neglectum is much more common in Java than *Z. inflexum*. It is collected: Buitenzorg, feet of Mt Salak unto 600 M. (type-specimen).
Banter djawa (Bandjar) BACKER n. 65.
Pelaboean ratoe, 5 M, KOORDERS 34352 B.
South. Pekalongan, Batang-lawa, BACKER Jan. 1918.
Nusa kembangan, KOORDERS 21992 B.
Gedongan Pare (Kediri) 150 M, KOORDERS 42863 B.
Gunung Wilis (Kediri) ravine of the Kali Purno, BACKER 11616.
Kebon dalem (Tjandiroto) 600 M, LÖRZING 770.
Vernacular name, near Buitenzorg "*Tongtak*", in Pelabuan "*Belacatoa*" KDS.

17. Z. macradenium K. SCH. (1904) 174; VAL. 1905 t 173? — *Z. spectabile* Griffith Notul. 3 (1853) 413; RIDLEY 1899, 128; 1907, 26.

According to RIDLEY this species is not specifically different from *Z. spectabile* and ought to be taken as a synonym. Certainly they are nearly related, there are however some notable differences in the descriptions. In *Z. macradenia* the largest spikes do not surpass 200 mm, the bracts are oblong-obovate, the bracteoles and corolla tube 55 mm. long; the *calyx much shorter* only 25 — 30 mm. long (with the ovary). The lip is black purple or violaceous with yellow spots. Leaves 400 × 50.

In *Z. spectabile* the spike is a foot long (= 330 mm.), the bracts are ovate, the *calyx is as long as the corolla tube*, 1.5 inch = 40 mm, the lip is yellow with dark purple spots. Also the leaves are broader (300 × 100) and much more pubescent.

Z. macradenia was collected in Padang, but Lörzing collected in Deli a specimen which I refer here. In this both the corolla-tube and bracteole are much shorter and surpass the calyx a little. This specimen is perhaps an intermediate form.

Distribution: Sumatra: Padang, leg. Burck, C.H.B. XI. B^4 25, ^{5} 54; Beccari (type specimen); Deli, Sibulangit 500 M., leg. Lörzing no 4376. (prob. a variety) "Herb, 3/4—1.5 M high, Scape 400 mm.; Bracts bright green with thin red veins and a red margo. Flowers pale yellow, Labellum large 3 lobed, middlelobe a little emarginate, darkbrown with many conspicious yellow spots. Connective almost as long as the labellum".

18. **Zingiber Lörzingii,** Val n. sp.

Herba robusta 1.5—2.5. M. alta. Folia maxima petiolata, lanceolato-oblonga adulta usque 630 × 150 mm. longa, apice acute attenuato-acuminata, basi obliqua acuta subtus pilis appressis conspersa. Petiolus 40 mm. longus profunde canaliculatus basi inflatus. Ligula (brevis?) scariosa, fugax. Vagina vix pilosula.

Spica longe pedunculata magna subglobosa, squarrosa, appresse pilosula; bracteae cymbiformes apice acuto uncinato-deflexae, siccando lanceolatae. Bracteolae ovatae, acutae, convolutae tubum aequantes, 40 × 16. Flores majusculi (70 mm.) pallide flavi labello aurantiaco. Calyx subtruncatus dentibus 3 brevissimis subaequalibus (20 mm). Petalum dorsale lanceolatum acutissime cucullatum. Petala laterales oblonga obtusa. Tubus 33 mm. longus. Labellum, cum staminodiis basi plane adnatis rotundatis, late ovatum, latius quam longum (28 × 30), apice late rotundato, breviter incisum et dentibus brevibus rotundatis instructum. Anthera 15 mm. longa, rostro aequilongo. Ovarium pilosum. Stylodia subulato-cylindrica 7 mm. longa. Capsula magna (40 × 15), superne attenuata et complanata, pilosula.

"The rhizome is internally greyish-white. The inflorescences, resembling a large "Ostrich-feather-aster" because of the projecting and decurved bracts, ± 150 mm. long, 120 mm. wide. Peduncle ascending, 100 mm. high. Younger parts of the infl. whitish, older parts bright crimson red. Flower pale light yellow; with a dark-orange coloured or coralred yellow-motled labellum and anther" (Lörzing).

Habitat: Sumatra; Sibulangit, nature reservation at 350 M. in the ravine Lan Klewang.

Zingiber Kunstleri Ridl. has only been described from a drawing and notes of Kunstler. The description here given of this new species agrees in many capital points with the adumbrations of Ridley; e.g. the decurved crimson lanceolate bracts, the apparent wanting of staminodes, the white and red flowers. It disagrees however conspicuously by the shape of the labellum which is said to be lanceolate, while in our plant it is as wide as long and rotundate almost square, (see our Pl. 21, f. 1, 2). Moreover the bracts of the peduncle have no blades as in the original description, and the measurements of all parts are twice as large. Both species are apparently very near to *Z. inflexum* Bl. from Java, but there the dimensions are much shorter and the lip and adnate sidelobes are black-purple or violaceous.

19. Zingiber macroglossum Val. n. sp.

Herba robusta 2 — 3.5 M. alta, subnutans. Folia *magna* (ad semimetralia) sessilia lanceolata basi valde attenuata et canaliculata, apice acute tenuiter acuminata, supra glabra subtus appresse pilosula, ciliata, 400 — 500 × 110 (in sicco). Ligula *maxima* 50 — 70 mm. longa 20 — 30 mm. lata, hyalina chartaacea apice subintegra, dorso cum vagina pilosula.

Spica pedunculata, pedunculo mediocri (200 — 400 mm.) demum procumbente vel arcuato-deflexo; squamae late oblongae (70 mm. × 20) coriaceae tomentosae parte superiore imbricantes. Spica ovato-oblonga obtusiuscula (130 × 45). Bracteae densae appressae, oblóngae vel late ellipticae, rotundatae, mucrone nullo vel inconspicuo, margine latissimo (3 — 4 mm. in sicco), tenuiter tomentosae, margina villosae, infra medium spicae ad 65 × 35 mm. longae. Flores „toti albi", ceterum ignoti. „Spicarum bracteae griseo-flavae margine rubro-brunneae vel toto rubro-brunneae. Flores toti albi, anthera pallide flava".

Distribution: Sumatra occ., Sibulangit, in djungle-reservation in humid places, at 300 M. LÖRZING 5235.

Though there are no flowers available for examination, the species is well enough recognizable by the above description.

The ligula is taller than by any species known (2 — 3 inches) and among those species the ligula has been described of till now, *Z. ligulatum*, Roxb. differs considerably by the whole habit, lower stature, short peduncle, ligula 20 mm long, etc, though it resembles by the white flowers; *Z. intermedium* (ligula 40 mm) differs by the acuminate ligula, the blackpurple labellum, etc., *Z. squarrosum* Roxb. (ligula 35) by the very different short-peduncled spike, the colour of the flower etc; and so do *Z. roseum*, Rosc., *Z. chrysanthum*, Rosc., *Z. rubens* Roxb.

It is apparently nearest to *Z. acuminatum* Val. Here the peduncles are always procumbent or creeping, and very varying in length; the bracts are rotundate and without mucro, the flowers white. But here the margo of the bracts is very narrow and the ligula is very short.

20. Zingiber pachystachys Val. n. sp. male cognita.

Herba, folia, flores ignota.

Spica maxima, (nunc 150-180 × 50-60 mm) cylindrica acutiuscula, laevia, sericeo-tomentosa. Bracteae late ellipticae (50 × 36) suborbiculares, rotundatae, appressae *haud gibbosae*, margine angusto villoso, sub apice submucronatae, sericeo-puberulae. Bracteola ovato-oblonga nunc 30 × 10, calycem haud superans.

Java, leg. KDS, sine numero.

Though there is so very litle known about this species I do not hesitate to relate it here, because it is certainly new and it is certain to be rediscovered as soon as the ultimate eastern and western parts of Java are better scrutinized.

It seems to belong to the "*acuminata*" (or "puberula") group.

Species male cognitae:

Zingiber brevifolium K. SCHUM. 1899, 268; 1900, 225; 1904, 167. Nova-Guinea: Kaiser Wilh.-land, LAUTERBACH n. 1596. (non vidi). Species prope *Z. cassumunar* militari apparet.

Z. pachystachys, see above.

Z. porphyrosphaera, K. SCHUM. 1. c. Borneo, Rejang (HAVILAND 442).

Z. stenostachys, K. SCHUM. Borneo, Guning Balacan et Sakumbang, (KORTHALS).

Z. macrorhynchus, K. SCHUM. Sumatra, (FORBES 1756 A.)

Z. coloratum, N. E. BROWN. Nord-West Borneo, (BURBIDGE).

Z. borneense, K. SCHUM. Borneo Sarawak (Haviland 1855), G. Sakumbang (KORTHALS).

Z. macrocephalum (Zoll.) K. SCHUMAN East-Java, Malang Zoll. 2293.

Z. tongtak K. SCHUM. Malay Arch. "TEYSMAN". This species is most probably a synonym of. *Z. neglectum* Val.

Species excludendae:

1. *Zingiber marginatum* (ROXB ?) Bl. Enum. (1827, 44) est — *Globba marantina* LINN.

The diagnosis of BLUME is of no use but from his quotation of RUMPH V 148 t 64 f 2 it is manifest that he meant *Globba marantina* LINN., though the name cited by him, "*lampujang pait*" points to *Z. amaricans*.

2. *Zingiber alliaceum* K. SCHUM (1904, 179) est *Z. gramineum* Bl., = *Zingiber (elatum?)* Herb. Calcutta in Herb. L. B. (not ROSCOE tab. 91 :) This species was based by K. SCHUMANN upon *Donacodes alliaceus*, T. et B., probably owing to some wrongly determined specimen of *Zingiber gramineum* Bl., which he examined. As I have demonstrated in Ic. bog (1912 t. 350), *D. alliaceus* T. et B. was not a *Zingiber* but a *Hornstedtia*. In the Leyden Herbarium I saw a specimen much resembling *Z. gramineum* distributed by the Calcutta Herbarium, determined with SCHUMAN'S own handwriting as *Z. alliaceum*, and in his monography he omitted *Z. elatum* ROXB.

SUPPLEMENT.

§ 1. During the printing of the MS. a still unknown species flowered for the first time in the HEYNE culture-garden:

Curcuma sylvatica Val.

Rhizoma crassum elongatum saepe strictum, sordide flavum (226 cod.) odore aromatico, amaro, calido. Rami sursum recurvi. Tuber mediocris intus sulfureus (236). Rami juveniles viridi-flavi. Herba juvenilis florens fere metralis.

Folia nunc juvenilia subsessilia, 520 × 195 (P = 2,7), elliptico-lanceolata, acute subacuminata, adultiora 200 mm longe petiolata oblongo-lanceolata, basi longissime attenuata, 660 × 107 (P = 3.9).

Costa in foliis juvenilibus supra purpurea, macula brunnea in parenchyma transiens, ad basin usque decurrens apice brevi viridi, infra etiam secus costam conspicua, cetera folium intense viride, (304) In fol. adultioribus costa ipsa viridis, marginibus brunneis, folia adulta concoloria, viridia.

Ligula substricta 1 mm lata, glabra. Vagina glabra.

Inflorescentia lateralis, cum scapo semimetralis. Scapus vaginis paucis appressis submucronatis. Spica magna dense bracteata; bractea peduncularis superior 25 mm sub spica inserta, florem fovens. Bracteae florentes sat late patentes bursa brevi, late ovatae subacutae, apicibus leviter recurvis, pallide virides, apice concolore (286 cod.).

Bracteae comae elliptico-oblongae apice brevissime mucronatae quam florentes multo longiores, apice dilute rubro-violaceae (551 — 556) parte inferiore albae, medio striatae pallide violaceae, virides et albae. Flores mediocres, erecti, vix supra bursas protrusi, cremei, tubo dilute sulfureo, petalis niveis, labello apice patente et decurvo, linea mediana labelli citrina in lobum bifidum latum et leviter prominulum excurrente; alabastra vix conspicue rosea. Calyx corollae tubum dimidium superans, dentibus convexis. Corollae tubus mediocris, 2/5 totius floris attingens. Faux sat inflatus, labellum (20 × 18), lobo mediano lato prominente, lobis rotundatis. Staminodia magna, cum filamento adnato 16 mm longa 10 lata, obovato-oblonga apice rotundata.

Filamentum 8 mm. longum pro dimidio staminodiis adnatum, anthera brevis cristula nulla, calcaribus rectis, thecis paullum breviores, thecorum suturae basi acutae, haud decurrentes. Stylodia longa 7 mm.

Dorsal petal wide much fornicate, with a short strong point. Lateral petals ovate. Hairring not very dense.

Habitat: Madura, cult, in Horto Heyneano No. 89, nomen indigenum „*Badur*". Though resembling by its general habit as well *C. Zedoaria* as

C. xanthorhiza this species differs conspicuously from both of them. The colour of the rhizomes is nearest to *C. Zedoaria*, but more yellow, the principal rhizomes are much longer, the branches more curving. The red colour on the young leaves is less intense, though more transparent at the backside. The adult leaves are quite dark green. The spike differs from *C. Zedoaria* by the larger number of bracts (40 in the present specimen of which 13 belong to the coma) which are diluted green without a purple tip, while the comabracts are here more pure violaceous-red, (551 cod.) passing in white below, and have a dark reddish tinge in *C. Zedoaria* (578 cod.). The shape of the bracts is also very much wider and more obtuse, the mucro is wanting in *C. Zedoaria*. Compared with it *C. xanthorhiza* has a still taller dense flowered spike with a very large intensely purple coma and purple tipped bracts. The flowers in *C. Zedoaria* are smaller, the tube is much shorter, the lip broader and the midlobe less prominent, the petals are pale rosy. The flower of *C. xanthorhiza* has red petals and has a much longer tube, almost as long as the limb with the faux (26 to 30).

It is not quite impossible that this species is the same as that represented by Plate XXX, which is still badly known.

The mean bracts in this new species are broadly obovate, rounded above with an obtuse, wide, not much prominent tip The full length is 42 mm., the greatest width 30 mm., the length of the adnate part 24 mm.

In many aspects, colour of the coma and the mean bracts, and of the flower, adult leaves quite green, the species resembles *C. Mangga*.

It differs however by the much larger dimensions of the spike and flowers, the more inflated faux, the broader and shorter, less prominent midlobe of the lip, and by the colour of the young leaves and the proprieties of the rhizome.

§ 2. Some notes about collecting and preserving of materials.

Whoever has been interested in studying herbarium materials of the order of *Zingiberaceae* has experienced the difficulty and often impossibility of identifying and describing species of that order by means of herbarium.

Partly this is due to the similarity in leafshape and habit in several genera, owing to which sterile specimens very rarely give certain indications about the species, but principally to the inadequate treatment of the flowers, in preparing them for the herbarium. In the large majority of specimens the inflorescences have been dried with the flowers still on and then in many species of this order, they get into such a condition that it is impossible, either by boiling in water or soaking with a solution of ammonia, to extract one single well conditioned flower from the cohering mass. One is often glad to find an adult bud, from which a few important characters may be derived. About the comparative dimensions of the parts and their adult shape this examination gives no or a false light.

In many cases this is a consequence of the soft structure of the often large flowers, the members of which once glued together cannot be separated uninjured, but in some genera the flowers are combined into dense, many flowered, bracteate spikes or racemes, growing near the soil and here flowers and young fruit are most often immersed in a hygroscopical mucilage, by means of which they are glued together, while drying up, to undisentanglable clumps.

A particular difficulty offer the flowers in some genera even when separated from their inflorescences before drying, by the slow way of dying during which the lip *(Nicolaia)* or the upper part of the tube *(Curcuma)* increases in thickness and in the same time curls up forming rather solid knots in which the original shape of the flowerparts is not to be recognised. By *Zingiber* in the same way the top of the tube shrinks together and cuts off the limb. Here is a very quick drying of the separate flowers under a moderate pressure most desirable. Flowers of *Curcuma*, pressed between blotting paper, without artificial heating, conserve during 24 hours the faculty of curling up, if the pressure be removed.

I may suppose the collector to be acquainted with the general rules of preparing herbarium. There are plenty directions to their information, none, however, more ad rem and more complete than the direction given by PRAIN (Memoirs and Memoranda, 1894) which of course is in every collectors hands in the tropics.

Regarding the plant group in consideration I refer the collector to the directions given by TURRILL (in Kew Bulletin 1914) how to prepare for the herbarium specimens of *Hedychium* so as to procure complete and satisfactory materials for a scientific study. The hints here given are also applicable to most other genera of the order, but suppose plenty of material, all necessary accomodations and some leisure. I only will indicate a few points which not being taken to heart by the collector depreciate often very much the value of the collected materials and reduce some rare and unique plants, collected with much painstaking, to useless trash.

The collector always should remember the saying of PRAIN (l.c.) that „a few specimens well preserved are worth a whole hayrick of rotten material".

It is now rather usual, in collecting, to preserve some separate flowers or entire inflorescences in alcohol. Of course this gives best chances for procuring uninjured flowers for examination. Still even in this process often much valuable material is spoiled.

So I often received entire inflorescences of *Zingiber* species, also of some *Amomum* and *Nicolaia* in alcohol. Now these inflorescences are more or less globose or cylindrical spikes, covered with rather rigid densely imbricating bracts, covering and protecting the buds until their opening; only a few open flowers are present at one time, the thin long tube of which remains under cover of the bract while the very delicate petals and sexual organs protrude. If these are forced into a fitting bottle or tube very carefully, for instance with a thin bamboo-chip fastened alongside and protruding at both ends, some flowers may be preserved uninjured, but very often all flowers have been crushed between bracts and wall of the tube or have been injured by the waving movement of the liquid.

Here a few or at least one single flower should have been cut out carefully with a fragment of the axis and a special bract, and preserved apart. If no fitting tubes for single flowers are available, larger tubes or even tinboxes containing several flowers may be used, if each flower be carefully enwrapped in thin firm paper bearing the number of the specimen and the remaining room exactly filled up with thin shavings.

Dense inflorescences of other genera wanting a rigid covering, as for instance *Amomum*, containing several open flowers, do not claim so much precautions; still it is always very desirable to have at least one complete flower preserved apart. The urgency may be left to the judgment of the collector.

The gathering of flowers etc. preserved in spirit, does not discharge the collector from his duty to dry also entire or sliced inflorescences for the herbarium. Without complete inflorescences or such divided into halves, no herbarium is satisfactory for scientific study.

In preparing of herbarium of this order I recommend the following precautions. Beyond as large parts of the foliate stem as the collector thinks fit there should always be taken some single leafblades, with their petiole and ligula with part of the sheath, and these must be taken as well from the top as from the elder parts of the stem and also from young stems, for the structure of the ligula is often very different in old and young stems and the tomentum is much more conspicuous in younger than in adult parts. As is pointed out already, entire or halved inflorescences should be dried, and here if no spirit is used the drying apart of some single flowers (the ovary and special bract not to be omitted) is of high urgency.

The single flowers should be laid out flat as far as possible and be dried under a moderate pressure enwrapped in blotting paper or newspaper as quickly as anyway possible, in order to avoid the structural changements in the flower indicated above. The most trying material for the preparator are certainly the flowers of the *Curcuma* spec. which, being dried without artificially heating either curl up (when not enough pressed) or when pressed too much get transformed into thin membranous rags not able to be prepared for examination. Splendid specimens however are to be got by splicing the spikes, taking out open flowers and some buds, and also some entire fascicles enveloped by their special bracts, and cutting out a few bracts of the upper, mean and lower parts of the spike, and drying all (the flowers under moderate, the rest under rather heavy pression) in an appropiate stove or on a coal fire or in full sunshine. The flower may be dried entire or sliced up between one of the staminodes and the labellum and laid open (the latter manoeuvre is to be preferred). Flowers dried in such a way, being soaked in diluted ammonia, are almost as good for study as fresh ones.

So far as to the collecting. There is however an other way by which some collectors in gathering plants of this order are largely sinning and this is by adding incomplete notes about colour of flowers, bracts and leaves, (in *Curcuma* and *Zingiber* also of the rhizome) habit, heighth, length of scapes of lateral inflorescences. Rather frequently I met in herbaria with inflorescences cut off at their base or with only the upper part of the peduncle, without mentioning of the whole length of it, or of its absence. *Curcuma*-species are often indeterminable because the spike was severed from the plant, without the least indication about its growing apart or at the top of the leaf stem. I also received sometimes specimens without flowers because the collector in gathering them remembered having taken the same flowers already at a former occurrence, which remembrance afterwards by inspecting the leaves proved an illusion. I cannot enough recommend the beginning collectors never in such a case to trust to memory, however trustworthy it may be, and always to provide specimen, notes, and separate parts with one same number.

§ 3. Just before the finishing of this publication, the first flower appeared of a plant sprung from a rhizome of the Ceylon „*turmeric*" which I thank to the kindness of Mr. PETCH, curator of the Botanical Garden of Peradenyia, and which was grown in the HEYNE culture garden in March of the year under No. 727.

The plant is rather poor but it resembles in all aspects the javanese „*kunyit*". So did the rhizome. and so does the flowering spike. The coma is purely white, no purple tinge at the top, the mean bracts pale green, the flowers identical to those of the malayan „*kunyit*" and of the Singapore „*turmeric*" with the same broad and strong spurs with outward bent tips.

Hereby my suggestion that *Amomum Curcuma* Jacq. often considered as the type of the „*turmeric*" is a different species, has become almost a certainty, and I suppose that the pink coma bracts mentioned by all authors except RUMPH, KOENING and ROXBURGH, base on a tradition, no author since ROXBURGH having seen the living spikes till now.

LITERATURE.

Andrews, Botanical Repository (1797-1804), *non vidi*.

Baker, Scitamineae, in Hook f. Fl. India 6 (1894).

Bentham et Hooker, Genera plantarum Vol III (1880-1883).

Bentham, in Lond. Journ. Bot. II (1843).

Bentley & Trimen, Medicinal plants Vol. IV (1880).

Blanco, Flora de Filipinae, (1837).

Blume, Enumeratio Fl. Javae (1827 & 1830).

Boerlage & v. Hasselt, Bijdr. tot de Flora v. Midden Sumatra (1884).

Brown, in Illustration horticole 31 et 33 (1884, 1886).

Brown, in Gardener's Chronicle 18 (1882).

Burkill, in Proceed. Cambridge Phil soc. IX (1896).

Burmann, N.L. Flora Indica (1768).

Burmann, J. Thesaurus zeylanicus (1737).

Colla, Nova gen. Scitaminearum (1830), *non vidi*.

Costerus, das Labellum u. das Diagram der Zingiberaceae (1915), in Ann. Jard. bot. de Buitenzorg, 2e ser. 15.

Costerus, Fresh investigation, in Ann. J. bot. Buit., 2e sér. 14 (1916).

Costerus, Ubereinstimmung und Unterschied in dem Bau der Blumen von Canna und der Marantaceen in Ann. Jard. bot. Buit., 2e ser. 15 (1916).

Curtis, Bot. Magazine.

David Dietrich, Synops. plant., 1839.

Dryander (Jonas), On genera and species in prof. Gmel. Ed. of Linn. syst. nat., in Trans Linn. ser. II 213 (1794).

Edwards and Lindley, Botan. Register (1815-1847).

Forbes, Wanderings of a Naturalist in the Mal. archipelago (1885).

Gagnepain, Notes sur les Zingibéracées du Museum, in Bulletin Soc. bot. Fr. T. 48 (1901) — T. 60 (1913).

Gagnepain, Zingibéracées, in Flore génerale de l'Indochine (Tome VI, 1908) p. 25.

Gibbs, Contributions to the Flora of Mount Kinabalu, in Journ. Linn. Soc. (1914) V. 42.

Gibbs, Phytography and Flora of the Arfak mountains (1917) 102.

Griffith, Notul. III (1851); Ic. pl. t. 352 — 358 (1847).

Hallier, Neue u. bemerkenswerte Pflanzen aus d. Mal. Pap. Inselmeer, in Ann. J. bot. Buitenzorg XIII (1896).

Hallier, Fortsetzung, in Bull. Herb. Boissier Tome VI (1898).

Hallier, Rapport over de botanische tochten in Borneo's Westerafdeeling ged. d. Borneo-expeditie 1893 — 94. Met een schetskaartje in Nat. Tijdschr. Deel LIV (9e ser. 3) 1895, 406.

Hance, in Journ. Linn Soc. (Bot.) XIII p. 6 (1871).

Hasskarl, Adnotationes, in T. Nat., Gesch. 10 (1843).

Hasskarl, Blanco, Flora der Philppinen, critisch beleuchtet, in Flora Bd. 42 (1864).

Hasskarl, Catalogus (1844).

Hasskarl, Decades Plant. rarior. H. bogor, in Tijdschr. Natuurl. Gesch. 5. (1839) et 9 (1842).

Hasskarl, Plantae Javanicae rariores (1848).

Hayata (B.), Icones plantarum Formosanarum V (1915).

Hemsley, New Solomon island plants, in Ann. of Bot. V (1890) t. 27, 501.

Hermann, Hortus Lugduno-batavicus (1737).

Hermann, Musaeum zeylanicum (1721, 1726).

Heyne (K.), De nuttige planten van Nederlandsch-Indië. Eerste stuk, (1913).

Hooker, f., in Botan. Magazine t. 5620 (1867). t. 6999 (1888).

Hooker, (W. J.), Botanic. Miscellany; sec. series in Journal of Botany I (1834).

Horaninow, Prodrom. Monogr. Scitaninearum (1862).

Jack (W.), Descriptions of Malayan Plants, in Calcutta Journal of Nat. Hist. 4 (1843).

Jacquin, Hortus Schoenbrunnensis 3 (1797), *non vidi.*

King and Prain, On Croftia, Journ. As soc. 65, 2 (1896) 297.

Klincksieck (M.P.), Nouveau répertoire des couleurs a l'usage des naturalistes in Bulletin (1906) T. 53 p. 594.

Klincksiek et Valette: Code des Couleurs (1908).

König, vide Retz.

Koorders, Excursionsflora (1914).

Kuhl & v. Hasselt, Icones ineditae in Museo Herb. Bog.

Lauterbach, vide Schumann.

Lestiboudois, Observations sur les Scitaminées, in Ann. Sc. nat. 2e ser. 15 (1841) 305.

Linne, Hort. Cliffordtianus (1750).

Linne spec. Plantarum (1753).

Loureiro Flora de Cochinchina (1790 & 1793).

Merrill, an Interpretation of Rumphius 's Herbarium amboinense (1917), 151.

Merrill, Reliquiae Robinsonianae (1916).

Merrill, A contribution to the Bibliography of the Botany of Borneo, in Sarawak Mus. journ. 1915.

Miquel, Flora v. Ned. Indië (1857).

Miquel, Sumatra (1862).

Miquel, Zingiberaceae, in Ann. Mus. L.B. (1868) 4, 99.

Paxton's Magazine of Botany, 4 (1838) 245.

Petersen, Zingiberaceae, in Engl. u. Prantl., Natürl. Pflanzenfam. 2, 6, (1889, 10).

PETERSEN, Flora brasiliensis, (1890) 3, 3.

PRAIN, in Journ. As soc. Str. branch. vol. 31 (1899).

PRAIN, Directions for drying specimens of plants for a Herbarium, in Memoirs and Memoranda (1894).

PRESL, Reliquiae Haenkeanae (1831).

RENDLE, HOSE's Bornean Monoc., in Journ. of Bot. 39 (1901).

RETZ, Observationes III (1792), VI (1791), 18.

RHEEDE, Hortus Malabaricus II (1692).

RIDLEY, (H.N.), On the monocotyledonous plants of New-Guinea, in Journ. of bot. 84 (1886) 356.

RIDLEY, Flora of the eastern coast of the Mal. Pen., Trans Linn. Soc. III, 9 (1893), 267.

RIDLEY, Malayan Plant names, in J. As soc. sér. 6. (1897).

RIDLEY, the Scitamineae of the Mal. Penins., in Journ. A. S. Str. br., 32 (1899).

RIDLEY, New or Rare Mal. pl., in Journ. Str. br. 41 (1903).

RIDLEY, Idem Ser. II, in As. soc. Str. br. 44 (1905). *Non vidi.*

RIDLEY, Scitamineae of Borneo, in Journ. As. Soc. Str. br. 46, 47, (1906).

RIDLEY, Materials for a Flora of the Mal. Penins. (1907).

RIDLEY, New or rare Malayan Plants, ser. III — IV, in Journ. Str. branch, 49 — 61 (1907).

RIDLEY, New or Rare mal. pl. Ser. IV, in J. Str, br. 50 (1908).

RIDLEY, Heliconia's, in Agricultural Bulletin Straits, Fed. Mal. States, Vol. 7 (1909), 129.

RIDLEY, Flora of Telom and Botany in Journ. Fed. Mal. St. Museum (1909).

RIDLEY, New or rare Malayan pl., Ser. V, Str br. 54 (1909) p. 56.

RIDLEY, Scientific Expidition to Temengoh, Upper Perak, Journ. Str. br., 57 (1910) p. 100.

RIDLEY, Borneo plants of Batu Lawi Journ. Str. br. 59 (1912) No 63.

RIDLEY, A new Alpinia of Borneo in Journ. of Botany T. 51 (1913) *Non vidi.*

RIDLEY, vide GIBBS, (1914),

RIDLEY, report on the Botany of the WOLLASTON expidition in Trans. Linn. Soc. 9.1 (1916).

ROBINSON, vide MERRILL.

ROSCOE, A new arrangement of the Plants of the Scitamineae, in Trans. Linn. Soc. 8 (1807).

ROSCOE, in Trans. Linn. Soc. II (1815).

ROSCOE, Monandrian Plants (1828).

ROXBURGH, in Asiatic Researches XII 350 (1810). *non vidi.*

ROXBURGH, Plants of the Coast of Coromandel III (1798) t. 201.

ROXBURGH, Flora indica I (Carey 1820).

RUMPHIUS, Ambon. Kruidboek V, (1746).

SACCARDO, Chromotaxia (1894).

SCHLECHTER, Die Gattungen Gastrochilus Don und Gastrochilus Wall. in FEDDE, Repert. Bd 12, 1913 p. 313.

SCHUMANN, Das Pflanzenreich IV, Zingiberaceae (1904).

SCHUMANN, Monographie der Z. von Malaisien u. Papuasien, in Engl. Jahrb. 27, (1900).

SCHUMANN, Flora Kaiser Wilhelmsland (1887).

SCHUMANN & LAUTERBACH, Flora des deutschen Schutzgebietes (1901).

SCORTECHINI, Nuove Scitaminee, in N. Giorn. Ital, 18 (1886) 310.

SMITH, Exotical botany II (1805), *non vidi.*

TEYSMANN & BINNEND., in Nat. tijdschr. Ned. Ind. XXXV etc. (1874 — 1876).

TEYSMANN & BINNEND., in Ned. Kruidk. Arch. III (1855).

TEYSMANN & BINNEND., Catalogus (1866).

TRIMEN, Flora of Ceylon, IV (1898).

TURRILL, Hedychium coronarium and allied species, in Kewbulletin (1914) 368.

VALETON, vide GIBBS, (1917).

VALETON, vide MERRILL.

VALETON, Über Neue und unvollständig bekannte Zingiberaceen aus West Java und Buitenzorg, Bull. Inst. Bot. Buitenzorg 20 (1904).

VALETON, Zingiberaceae von Neu Guinea in Engl. Jahrb. 52 (1914), 40 — 100.

VALETON; Neue Zingiberaceae, in Icones Bogorienses (1904 — 1914).

VALETON, Nova Guinea VIII (1913), 923 — 988.

VAN HOUTTE, in Flore des serres 10 (1854) t. 1041.

WALLICH, Initiatory attempt to define the species of Hedychium, in Journ. of Bot. V (1853).

WALLICH, Pl. As. rariores (1853).

VAN ZIJP, Beiträge z. Kenntniss der Zingiberaceae, in „Recueil des Travaux Botaniques neerlandaises 12 (1915)," and „14 (1917), p. 127."

VAN ZIJP, Bijdrage tot de kennis der Zingiberaceen, in „Pharmaceutisch weekblad 54 (1917) 328."

EXPLICATION OF PLATES.

Plate I.

Curcuma longa Linn. = C. radice longa Herm. from Hermann, Hort. Academici Lugduno-batavici Cat., (1737).

Plate II and III.

Fig. 1, 2. *Curcuma purpurascens* Bl. Flower, nat. size.
3. The same, seen from face, enlarged.
4. The same, with decurved lip, showing staminodes.
5. The same, from the backside, with dorsal lobe bent down, showing staminodes from back side.
6, 7. Stamen, lip and staminodes being removed.
8*a*. *b*. Pollination, from Forbes, Wanderings.
9, 10. *Curcuma aurantiaca* v. Z. Flower, nat. size.
11. The same seen from face, enlarged.
12—14. Stamen, after removing of the other flower parts.
15—17. Stamen, 5 × enl.
18. Anther from a bud, 6 × enl.
19. Flower from face, lip bent down, nat. s.
20, 21. Stamen of *Curcuma petiolata* Roxb. enl.
22. Anther, showing the furrow on the spurs, much enl.
23, 24. *Curcuma australasiaca* Hook, anther (from Hooker, Bot. Mag. t. 5620).
25. *Curcuma aeruginosa,* anther.
26. The same, seen from the base, showing the obsolete furrow of the spur.
27, 28. Young stamen of *C. aurantiaca,* much enl.
29. Pollinium, isolated from 28. 10 × enl.

Plate IV.

Fig. 1. Rhizome complex of *Curcuma domestica.*
2. Rhizome complex of *C. purpurascens.*

Plate V.

Fig. 1. Rhizome complex of *C. colorata.*
2. Rhizome conplex of *C. Heyneana.*

Plate VI.

Fig. 1. Rhizome of *Curcuma Mangga,* fig. A, purchased on the bazar, nat. s. Fig B. and C. from a living plant, diminuted.
2. Rhizome complex of a luxurious growing plant of *C. Mangga* Much dimin.

Plate VII.

Fig. 1*a*. Rhizome complex of *Curcuma Zedoaria.*
2*b*. Rhizome conplex of *C. aeruginosa.*

Plate VIII.

a. Rhizome complex of *C. xanthorhiza.*
b. Rhizome complex of *C. petiolata.*

Plate IX.

Fig. 1. *C. purpurascens*, young inflorescence, n.s.
2. *C. soloensis,* ligula, 2 × enl.
3. *C. soloensis,* the same, seen from the inner side.
4, 5. *C. zedoaria,* same n.s.
6. *C. aurantiaca,* the same n.s.
7. *C. aurantiaca,* Capsule 2 × nat size.
8. *C. aurantiaca,* seed, 5 × nat size.
9. *C. aurantiaca,* the same with expanded aril-lobes.

Plate X.

Gastrochilus javanum K. Sch. (from a preserved inflorescence).
Fig. 1. Inflorescence, n.s.
2. Flower (in a living state).
5. Calyx.
4. Flower tube longitudinally split, with labellum and stamen.
5, 7. Petals, 2 × enl.
6. Staminode, 2 × enl.
Fig. 8—10. Stamen 5/1. Fig. 8 shows the stigma and the anther bowed backward, Fig. 9 the anther from the face in its natural position, the pores are bent forward, Fig. 10 Anther, seen from side.
11. Stigma 6/1.
12. Capsule.
13, 14. Seeds.

Plate XI.

Gastrochilus apiculatum Val, (from herbarium).
Fig. 1. Flowering herb. 1/2.
2. Leaf 1/1 showing the ligula auricles.
3. Inflorescence, showing the unilateral axe by removing the sheaths.
4. Anther, enl.

Plate XII.

Gastrochilus striatum Val., (from Herbarium).

Fig. 1. A young herb with part of the creeping stem.
2. Stamen, from a partly dishevelled flower, showing the paralle thecae and the crest.

Plate XIII.

Gastrochilus laxiflorum Val., (from Herbarium).

Fig. 1. Facies, 1/2 nat. size.
2. Leaf 1/1.
3. Bract with 2 flowers, nat. size, the left one consisting of pedicel, calyx and part of the tube.
4. Stamen 4/1.
5. Labellum 2/1.
6. Bract, nat. size.

Plate XIV.

Gastrochilus Kunstleri (Baker) Val.

Fig. 1. Habitus, from Herb, much diminuted.
2. Flower with bract and bracteoles (from preserved mat.), coroll-lobes bent down, showing stamen and staminodes, n.s.
3. Idem, outer bract removed.
4, 5. Limb of living flower, seen from the face and sideways, n.s.
6. Lip of living flower seen from above, showing the furrow at the base, and the mouth of the faux, anther not pictured.
7. Stylodes 2 × enlarged.
8. Calyx.
9—11. Anther, enlarged 5 ×.
12. Placenta in an abnormal but often occurring one-celled ovarium, reminding *Haplochorema*.

Plate XV.

Outlines of labellum and staminodes in the genus *Zingiber*. All figures drawn from fresh flowers, explained and dried. N.s.

Fig. 1, 2. *Z. officinale.*
3. *Z, Zerumbet.*
4. *Z. aromaticum.*
5. *Z. aromaticum*, var. *sylvestres.*
6. *Z. amaricans*, var. *obscura.*
7. *Z. Zerumbet*, var. from Djogdjakarta.
9. *Z. amaricans.*

Fig. 10. *Z. amaricans,* var. *major.*
11. *Z. amaricans,* flos bipetalus.
12. *Z. Ottensii.*
13. *Z. Carsumunar.*
14. *Z. gramineum.*
15. *Z. leptortachyum.*
16. *Z. macradenium.*
17. *Z. odoriferum.*
18. *Z. odoriferum,* var. *angustifolia.*
19. *Z. acuminatum.*
20. *Z. neglectum.*

Plate XVI.

Zingiber zerumbet L. and *Z. macradenium.* Sch.

Fig. 1. Spike (from a culture in Bzg., stock from Timor).
2, 3. Flower, nat. size.
4. *Zingiber macradenium* K. Sch. Flower longitudinally dissected 1/1.
5, 6. Appendix of the anther with the stigma, enlarged,
7. Stigma much enl.

Plate XVII.

Zingiber aromaticum Val. et *Z. amaricans* Bl.

Fig. 1. Spike of *Z. amaricans* var. *elongata.*
2. The same fruiting.
3. Bract with flower of the same.
4. Flower explained.
5. Bipetalous flower.
6. Spike of *Z. aromaticum* Val.
7. The same, flower from the face.
8, 9. Fl. of *Z. amaricans* Bl.

Plate XVIII.

Zingiber papuanum Val.

Fig. 1. A young spike.
2. A flowering spike.
3, 4. Segments of the stem and leaves.
5*a*. A bract, inner side.
5*b*. A bract, outer side.
6a. Bracteole.
6b. The same explained.
7. Labellum and staminodes, explained.
8, 9. Petals and Stamen, dry.

Plate XIX.

Zingiber Ottensii Val.
Fig. 1. Spike with a bud.
2. Bract from the inner side, showing the inflexed margin.
3. Bract from the top.
4, 5. Flower.
6. Labellum and Staminodes explained.
7, 8. Base of the leaf.

Plate XX.

Zingiber gramineum Bl. (Fig. 1 — 14).
Z. Cassumunar Roxb. (Fig. 15).
Fig. 1. Terminal spike, fruiting, forma genuina.
2. Lateral spike, young forma genuina.
3. Forma robusta, lateral spike.
4. Bract.
5. Bracteole.
6. Calyx.
7, 8. Petala.
9, 10. Labellum, (staminodes connate).
11—13. Capsula.
14. Labellum of forma robusta, explained.
15. *Zingiber Cassumunar.* Labellum and Staminodes.

Plate XXI.

Zingiber Loerzingii.
Fig. 1. Flower enclosed in the bract and bracteola (laid open, from preserved specimen).
2. Fl. laid open and dried (stamen crumpled).
3. Calyx.
4, 5. Capsule, young, preserved on alcohol.
6, 7. Bracts.
8. Capsule of *Z. gramineum.*
9—11. Capsule of *Z. aromaticum.*
12. Seed of *Z. Loerzingii.*

Plate XXII. Infl. of *Curcuma domestica* Val. from a very poor, rather abnormal, specimen grown from rhizomes of „*kunyit*" sent from Singapore, Fl. Sept. 1917. The figure is rather different from the normal type, by the very short spike, and the living spike is peculiar by the greenish white tinge of the coma. The flowers are however quite similar to that of the Java specimens, even in the characteristic spurs, and the very long free parts of the bracts are typical.

Plate XXIII. Infl. of *C. purpurascens*, Bl. from a very young plant; in strong growths, in normal specimens the infl. has at least the double size and fullness.

Plate XXIV. Infl. of *C. Brog* Val., much dim.

Plate XXV. Infl. of *C. colorata* Val. 1/2 dim.

Plate XXVI. Infl. of *C. euchroma* Val.

Plate XXVII. Infl. of *C. Zedoaria* Rosc. (Photographed by Mr. v. ZIJP from a Batavian cultivated specimen).

Plate XXVIII. Infl. of *C. xanthorhiza* Roxb.

Plate XXIX. Infl. of *C. petiolata* Roxb.

Plate XXX. Infl. of *C. Mangga* var. *sylvestris*. (see p. 53.) Photographed by Mr. VAN ZIJP from a plant, called *temu putih* in Malang.

Mr. v. ZIJP believes this specimen rather to belong to *C. Zedoaria* than to *C. Mangga*, considering growth, colour and odour of the rhizomes. Though he is quite right as to the rhizomes, I am of opinion that the structure of flowers and bracts points to a much nearer relation to *C. Mangga*

This species is called by the natives either„*koneng bodas*" sund. = „*temu putih*" mal. (name also given to *C. Zedoaria*) or, „*badur*" jav., the latter name being not certain but most frequently given to this species.

INDEX OF SCIENTIFIC NAMES.

Amomum montanum Koen., 138.
Amomum Zedoaria Willd., 60.
Amomum Zerumbet Linn., 129.
Amomum Zingiber Blanco, 129.
Boesenbergia Kuntze, 89.
Camptandra gracillima (K. Sch.) Val. 115.
Camptandra parvula Ridl.
  var. angustifolia Ridl., 114.
Curcuma Linn., 5.
Curcuma aeruginosa Roxb., 11. 13. 15. 16. 18. 22. 23. 30. 58. **65**. 68. 69. 70. 81.
Curcuma agrestis, 76.
Curcuma alismatifolia Gagn., 7. 8. 9. 10. 23.
Curcuma amada Roxb., 45. 46. 50. 53.
Curcuma amarissima Rosc., 69. 70. 71.
Curcuma aromatica Salisb., 13 70. 79.
Curcuma aurantiaca V. Zijp., 9, 10. 11. 12. 13. 14. 16. 21. 22. 23. 25. 26. 27. 28. 74. **76**. 114.
Curcuma australasiaca Hook. *f.*, 10, 28.
Curcuma Brog Val., 11. 16. 17. 30. 46. **48**.
Curcuma caesia Roxb., 65. 68. 70. 71.
Curcuma colorata Val., 11. 14. 17. 29. **40**. 43. 44. 75.
Curcuma cordata Wall., 7.
Curcuma cordifolia Wall., 7. 9. 10.
Curcuma domestica Lour., 31.
Curcuma domestica Val., 11. 12. 13. 14. 16. 17. 29. 31. 36. 39. 76.
Curcuma domestica major Rumph,, 34 61.
Curcuma domestica minor Rumph., 31.34 61.
Curcuma euchroma Val., 11. 15. 17. 22. 26. 29. 42. 49. 45 57.
Curcuma ferruginea Rosc., 70. 71.
Curcuma giring, 39.
Curcuma gracillima Gagn., 7.8.
Curcuma Heyneana Val. et v. Zijp., 11.13. 14.16 17.18.30.**54**.
Curcuma Kunstleri Baker, 7.9. **104**. 115.
Curcuma lanceolata Ridl., 7.9.
Curcuma latifolia Roxb., 39/**3**.
Curcuma latiflora Val., 10, 29.
Curcuma leucorhiza Rxb, 26. 50. 54.
Curcuma longa Linn., 24, 31. **78**. 79. 80.
Curcuma longilspica Val., **81**.
Curcuma Loerzingii Val., 11. 14. 30. **71**.
Curcuma Mangga Val. et v. Zijp., 11. 13. 14. 16. 17. 30. **50**. 53. 55. 56. 72. 76.
Curcuma Mangga, var. 17.
Curcuma Mangga var. rubrinervia, Val., 11. 14. 30.
Curcuma Mangga var. sylvestris Val., 11. 26. 30.
Curcuma meraukensis Val., 8. 10. 29.
Curcuma ochrorhiza Val., 11. 14. **45**. 50.
Curcuma parvifolia Wall., 7. 8.
Curcuma petiolata Roxb., 6.7.9.10.11.12. 14. 16. 19. 22. 25. 28 29. 48. **72**. 75. 78. 80.
Curcuma phaeocaulis Val., 11.15.18.22.30.
Curcuma porhyrotanica, Schum., 61.**80**.
Curcuma porphyrotaenia., 82.
Curcuma purpurascens Bl., **34**.38.42.46.61. 64.76.
Curcuma Roscoeana Wall., 6.7.8.
Curcuma rotunda., 79.
Curcuma soloensis Val., 11. 14. 17. 26. 30. **46**.49.
Curcuma sparganifolia Gagn., 7.8.**9**.
Curcuma sumatrana Mq., 13. 29. 61. 72. **80**.
Curcuma sylvestris Ridl. 8.
Curcuma viridiflora Roxb., 11. 14. 17. 29. **37**. 39. 57. 79.
Curcuma xanthorhiza Roxb., 11. 13. 15. 16. 18 22. 23. 30. 42. 43. 46. 57. 58. **61**. 60. 64. 65. 61. 80.
Curcuma Zedoaria Roxb., 11. 13. 15. 16. 18. 19. 22. 30. 39. **57**. 60. 64. 79. 80. 81.
Curcuma Zerumbet Roxb., 37. 57. 60.
Donacodes alliacea T. et B., 138. 148.
Dymzewicsia 130.
Dymzowiczia graminea, 130.
Gastrochilus Wall., 81.
Gastrochilus albosanguinea., 84.
Gastrochilus angustifolium Hall., 84. 87. 88. 89. 90. 101. 103. 104.
Gastrochilus anomalum K. Sch., 83. 84. 85. 89. 104.
Gastrochilus apiculatum Val., 89.**95**.
Gastrochilus bilobum Ridl., 83.100.

Gastrochilus bractescens Ridl., 85. 89. 90. 98. **103**.
Gastrochilus brevilabrum Val., latilabrum.
Gastrochilus cochinchinense Val , 83.
Gastrochilus Curtisii Bak., 82. 85. 88 89. 93. 96.97.
Gastrochilus gracile Val., 89. **103**.
Gastrochilus grandifolium Val., 82. 83. 85. 86. 89. 91. 97. **98**. 100.
Gastrochilus Hallieri Ridl., 89. 104.
Gastrochilus hirtum Ridley., 85. 89. 91. **96**.
Gastrochilus javanum K. Sch., 80. 85. 89. 90. **92**. 94. 113.
Gastrochilus Kunstleri (Baker) Val., 88. **104**.
Gastrochilus latilabrum Val., 89. 91. **99**.
latifolium Ridl. 87.
Gastrochilus laxiflorum Val., 87, 88, 89, 90.
Gastrochilus longiflorum Wall., 84, 87, 88. 103.
Gastrochilus longipes King et Prain, 87.
Gastrochilus Loerzingii Val., 89. 90. **94**.
Gastrochilus malaccanum Sch., 101.
Gastrochilus ochroleucum Ridl., 84.
Gastrochilus oculatum Ridl., 100.
Gastrochilus ornatum (Brown) Val. 89. 91.
Gastrochilus panduratum Ridl., 18. 78. 82. 85. 86. 88. **91**. 93. 96. 97. 99.
Gastrochilus parvum Ridl. 89.
Gastrochilus phyllostachyum Gagn., 85.
Gastrochilus plicatum Ridl., 83. 84.
Gastrochilus Prainianum Ridl., 88.
Gastrochilus pulchellum Ridl. 84. 86. 88 89. 90. **95**.
Gastrochilus pulcherrimum Wall., 83. 84. 99. 85 86. 87. 88. 89. 90. 95.
Gastrochilus reticosum Ridl., 89.
Gastrochilus rubroluteum Ridl., 84.
Gastrochilus Scaphochlamys Ridl., 86 88.
Gastrochilus striatum Val., 85.89.**97**.
Gastrochilus subbiloba Burk., 87.
Gastrochilus Thorellii Gagn., 84.
Gastrochilus violaceum Ridl., 89.91.**98**.
Gastrochilus vittatum Brown., 85.86.89.91.
Gastrochilus xiphostachyum Gagn., 84.
Globba marantina Linn.; 148.
Haplochorema K. Sch., 115.
Haplochorema decus sylvae, (Hall.) Val., **116**.
Haplochorema gracillipes K. Sch., 115.
Haplochorema oligospermum K. Sch., 115.
Haplochorema extensum K. Sch., 116.
Haplochorema petiolatum K. Schum., 116.
Haplochorema polyphyllum K. Sch., 115.
Haplochorema uniflorum K. Sch., 115. 116.
Hitcheniopsis Kunstleri Ridley., 104.
Hornstedtia alliacea Val., 139.
Kaempferia L., 106.
Kaempferia angustifolia Rosc., 82. 107. **111**.
Kaempferia anomala Hallier, 104.
Kaempferia atrovirens N. E. Brown, 82. 107.
Kaempferia campanulata K. Sch., 82.
Kaempferia candida Wall., 82, 83. 106.
Kaempferia cochinchinensis Gagn., 85. 86. 88.
Kaempferia cuneata Gagn. 8.
Kaempferia decus sylvae Hall., 116.
Kaempferia elegans Wall., 8. **82**. 106. 114.
Kaempferia fissa Wall., 82. 106. 107.
Kaempferia L., 82. 83, 107. **108**.
Kaempferia Gilberti Hort., 111.
Kaempferia gracillima K. Sch, 115., 114.
Kaempferia involucrata King, 109.
Kaempferia latifolia Donn., 108.
Kaempferia marginata Carey, 108.
Kaempferia ornata Brown 107.
Kaempferia pandurata Roxb., 79.
Kaempferia Prainiana Bak., 82.
Kaempferia pulchra Ridl., 83. 107. 108. 112.
Kaempferia Roscoeana Wall., 82. 107. 113.
Kaempferia rotunda L., 82. **106**. 107. 108. 109. 112. 113.
Kaempferia rotunda L. var. concolor Val. **110**.
Kaempferia secunda Hooker., 106. 114.
Kaempferia sessilis Koenig., 107.
Kaempferia undulata Teysm. et Binn., 107. **111**.
Lampugium., 121. 122.
Lampujum majus Rumph., 129.
Lampujum minor , 131.
Lampuzia., 122.
Pleuranthesis., 121.
Zerumbet 122.
Zerumbet Zingiber, 129.
Zingiber Adans., 118.
Zingiber acuminatum Val., 118. 122. 124. 126. 134. **141**. 142. 147.
Zingiber acuminatum var. acutibractea., 146. **142**.
Zingiber acminatum Val. var. borneensis Val., 126. **141**.
Zingiber acuminatum Val. 126, **141**.
Zingiber alliaceum K. Sch., 139. 148.
Zingiber amaricans Bl., 119. 125. 128. 129. 131. 132. **133**. **134**.

Zingiber amaricans, var. elongata 123. **134**. 135.
Zingiber amaricans var. fuliginea Val., **134**.
Zingiber aquosum Bl., 143.
Zingiber aromaticum., 119. 120. 123. 125. 128. 130. **131**. 132. 134.
Zingiber aromaricum var. obscura., **134**.
Zingiber borneense K. Schum., 148.
Zingiber capitatum Roxb., 122. 139.
Zingiber Cassumunar Roxb., 118. 122. 123. 127. **138**. 138. 148.
Zingiber chrysanthum Rosc., 137.
Zingiber coloratum Brown., 148.
Zingiber elatum Bl., 139, 148.
Zingiber elatum Roxb. 122.,
Zingiber gracile Jack., 140.
Zingiber gramineum Bt., 120. 121. 122. 124. 127. **139**. 148.
Zingiber inflexum Bl., 1218. 122. 124. 126. 143. **144**. 145.
Zingiber intermedium Bak., 147.
Zingiber Kunstleri Ridl., 122. 144. 146.
Zingiber latifolium sylvestre Hermann, 129.
Zingiber leptostachyum Val., 118, 119. 120. 124. 127. **140**.
Zingiber ligulatum Roxb., 118. 147.
Zingiber litorale Val., 123. 126. 128. **135**. 136.
Zingiber Loerzingii Val., 121. 122. 124. 125. 126. **147**.
Zingiber macradenium K. Sch., 118. 120. 121. 122. 124. 125. 126. **145**. 146.
Zingiber macrocephalum K. Schum., 148.
Zingiber macroglossum Val., 124. 127. **147**.
Zingiber macrorhynchus K. Sch., 148.
Zingiber marginatum (Roxb.?) Bl., 148.
Zingiber neglectum Val., 118. 121. 122. 124. 125. 131. 143. **144**. 145. 148.
Zingiber odoriferum Blum., 118. 119. 122. 124. 125. 139. 141. **143**.
Zingiber odoriferum var. genuina, 127. **143**.
Zingiber odoriferum var. aquosa., 127. **144**,
Zingiber odoriferum var. borneensis 127. **144**.
Zingiber officinale., 50. 118. 122. 124. **127**
Zingiber officinale var. Sunti., **129**.
Zingiber Ottensii Val., 119. 120. 122. 123, 125. 128. **136**. 137.
Zingiber pachystachys Val., **147**. 148.
Zingiber papuanum Val., 123. 126. 128. **135**.
Zingiber perakensis Ring., 135.
Zingiber porphyrosphaera K. Sch., 148.
Zingiber puberulum Ridl., 122. 141. 142.
Zingiber roseum Rosc., 174.
Zingiber rubens Roxb., 147.
Zingiber spectabile Griff., 118. 120. 145.
Zingiber spurium Koch., 129.
Zingiber squarosum Roxb., 147.
Zingiber stenostachys K. Sch., 140. 148.
Zingiber tongtak K. Sch., 148.
Zingiber Zerumbet Sm., 118. 119. 120. 123. 124. 125. 128. **129**. 130. 131. 132. 133. 136. 137.
Zingiber Zerumbet Sm. var. littoralis Val., 135.

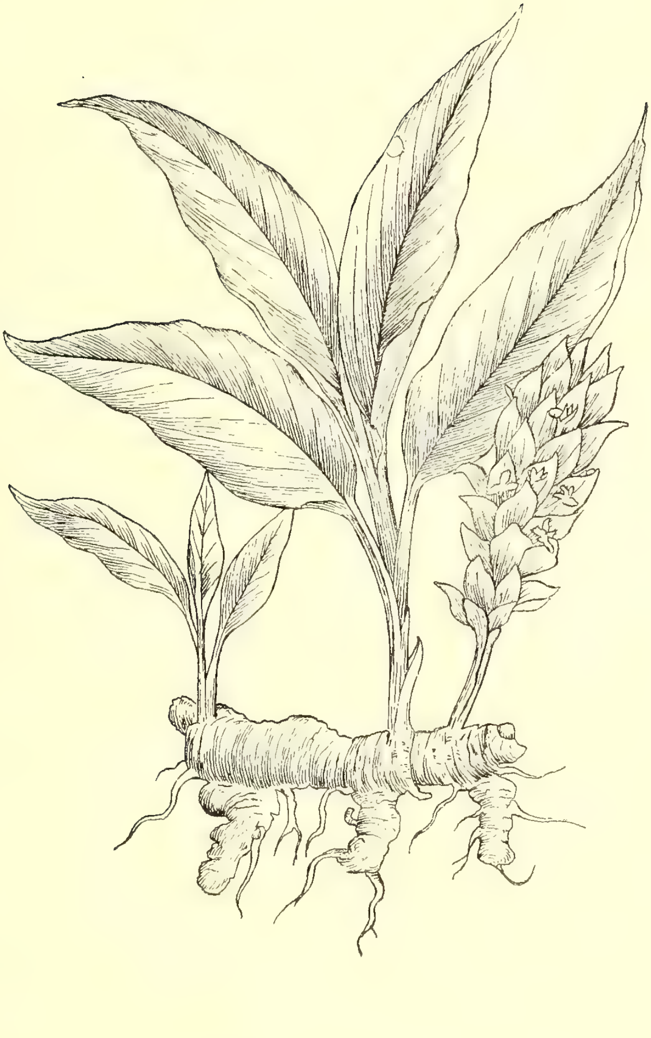
INDEX OF VERNACULAR NAMES.

Badur, (Supplement). 150.
Balacatoa, 143. 145.
Banglai ideung, 137.
Belenje, 37. 48.
Blobo, 77.
Djae, 129.
Gelenje, 37. 48.
Giri, 39.
Giring, 39. 56. 57.
Haliya, Jav. 129.
Haliya padi, 129.
Kalamaseo, 77.
Kentjoor, 108.
Koneng gedeh, 64.
Koneng temen, 33. 76.
Kuning Warangan., 33.
Kuning utan., 67.
Kunir, 33.
Kunir batok, 44.
Kunir bentis, 33.
Kunir putih, 111.
Kuntji, 92.
Kuntji kuning, 92.
Knntji kunot, 112.
Kuntji menir, 112.
Kuntji pepet, 111. 112.
Kuntji putih, 92. 112.
Kunyer, 33.
Kunyit, 33.
Lampujang, 130. 137.
Lampujang gadja, 130.
Lampujang ketjil, 133. 134.
Lampujang pait, 133. 134. 148.
Lampujang prit, 134.
Lampujang wangi, 133. 134. 140.
Lireh, 132. 133.
Mango, 53.
Mango-ginger, 53.
Pauh, 53.
Pho, 57.
Pingang, 37.
Prit, 133.
Purot, 77.
Sookoor, 109.
Sunti, 129.
Tema, 53.
Tema giring, 56.
Tema koneng, 56.
Tema lateng, 56.
Tema litjin, 56.
Temu badjangan, 53.
Temu gepijitan, 43.
Temu giring, 45.
Temu glenjeh, 45.
Temu itam, 65. 68. 70.
Temu ketek, 42. 45.
Temu kopyor, 48.
Temu kuntji putih, 92.
Temu ladi, 45. 48.
Temu lalab, 53.
Temu lati, 44.
Temu lawac, 60. 65.
Temu lawak, 46. 64.
Temu lawas, 65.
Temu mangga, 51. 53.
Temu pauh, 53.
Temu poh., 51. 53. 56.
Temu prit, 44.
Temu putih, 60.
Temu putri, 48. 76. 171.
Temu santen, 70.
Tinggang, 37. 39. 42.
Tis, 42.
Tjikoor, Sund., 108.
Tommon badur, 76.
Tommon tihing, 76.
Tongtak, 143. 145.

Plate 1.

Curcuma longa Linn. = C. radice longa Herm. from HERMANN, Hort. Academici Lugduno-batavici Cat., (1737).

Plate I.

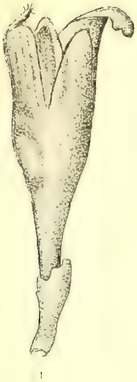


Curcuma longa Linn.

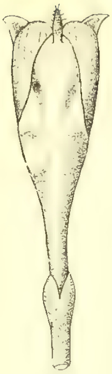
Plate II and III.

Fig. 1, 2. *Curcuma purpurascens* Bl. Flower, nat. size.
3. The same, seen from face, enlarged.
4. The same, with decurved lip, showing staminodes.
5. The same, from the backside, with dorsal lobe bent down, showing staminodes from back side.
6, 7. Stamen, lip and staminodes being removed.
8*a. b.* Pollination, from Forbes, Wanderings.
9, 10. *Curcuma aurantiaca* v. Z. Flower, nat. size.
11. The same seen from face, enlarged.
12—14. Stamen, after removing of the other flower parts.
15—17. Stamen, 5 × enl.
18. Anther from a bud, 6 × enl.
19. Flower from face, lip bent down, nat. s.
20, 21. Stamen of *Curcuma petiolata* Roxb. enl.
22. Anther, showing the furrow on the spurs, much enl.
23, 24 *Curcuma australasiaca* Hook, anther (from Hooker, Bot. Mag. t. 5620).
25. *Curcuma aeruginosa*, anther.
26. The same, seen from the base, showing the obsolete furrow of the spur.
27, 28. Young stamen of *C. aurantiaca*, much enl.
29. Pollinium, isolated from 28. 10 × enl.

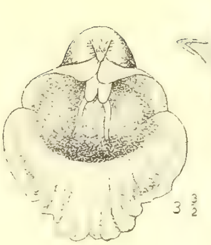
Plate II.



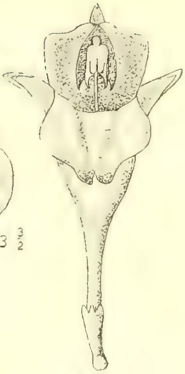
$\frac{1}{1}$



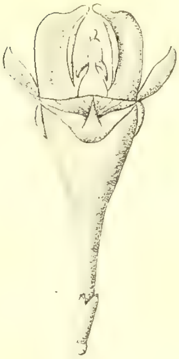
2.$\frac{1}{1}$

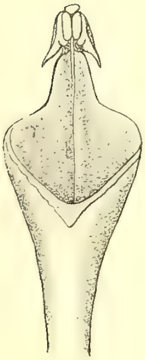


3 $\frac{3}{2}$

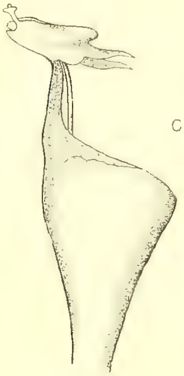


4 $\frac{1}{1}$

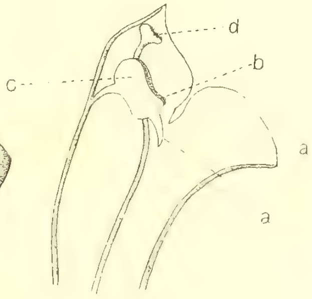




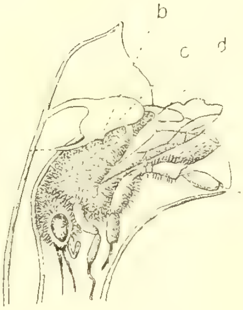
6.$\frac{2}{1}$



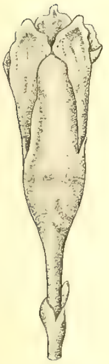
7 $\frac{2}{1}$



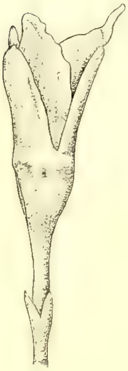
8 a



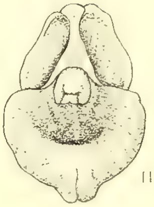
8 b



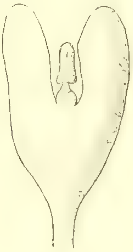
9.$\frac{1}{1}$



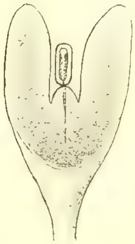
10.$\frac{1}{1}$



11. $\frac{3}{2}$



12.$\frac{1}{1}$



13.$\frac{1}{1}$

R.Natadipoera et Mh: Iljas del.

M.Kromohardjo lith.

Plate IV.

Fig. 1. Rhizome complex of *Curcuma domestica.*
2. Rhizome complex of *C. purpurascens.*

Fig. 1.

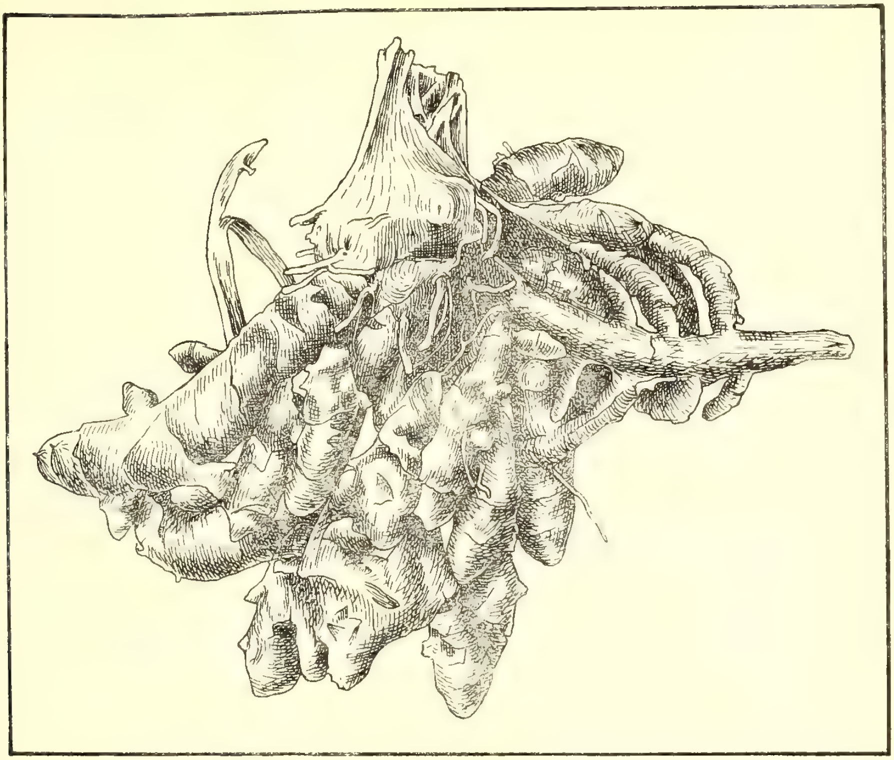


Fig. 2.

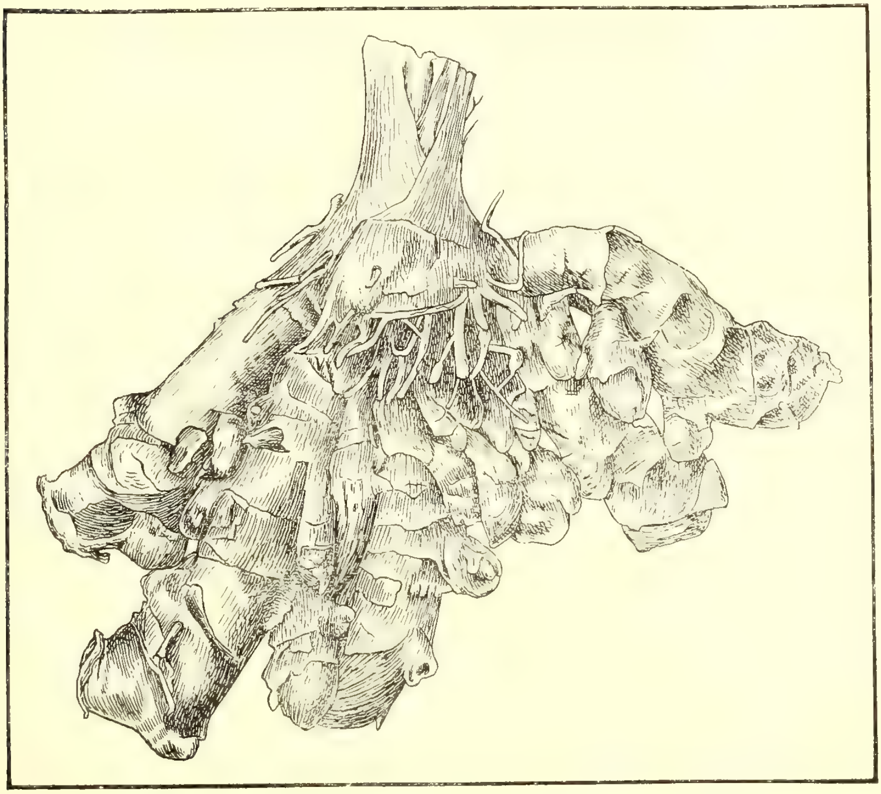


Fig. 1. Curcuma domestica
Fig. 2. Curcuma purpurascens.

Plate V.

Fig. 1. Rhizome complex of *C. colorata.*

2. Rhizome complex of *C. Heyneana.*

Fig. 1.

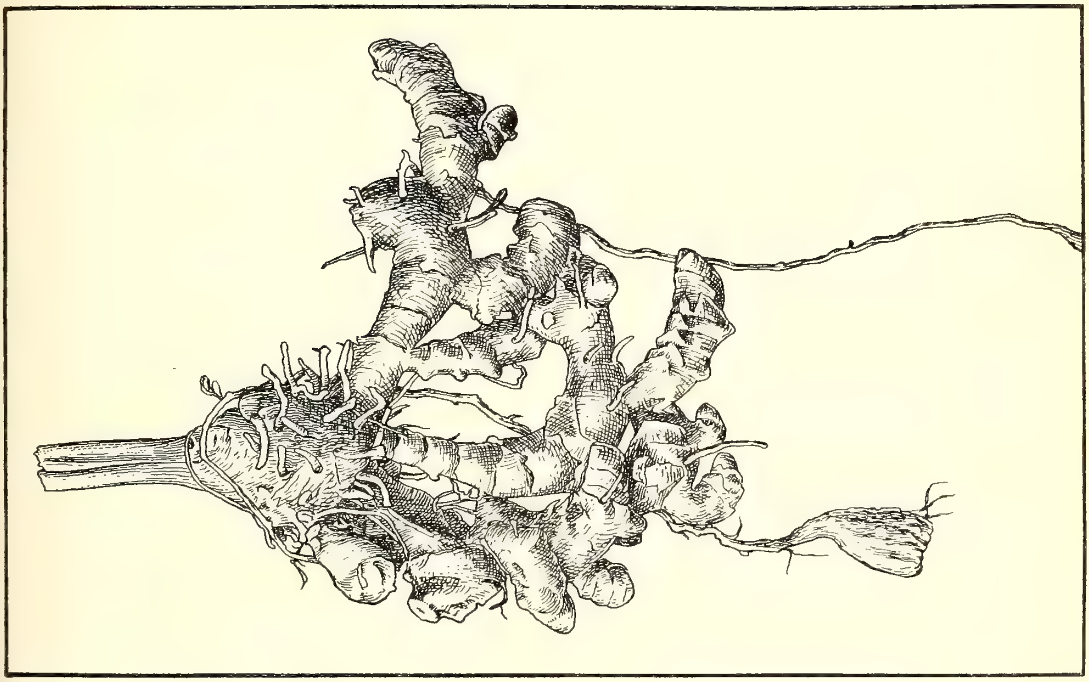


Fig. 2.

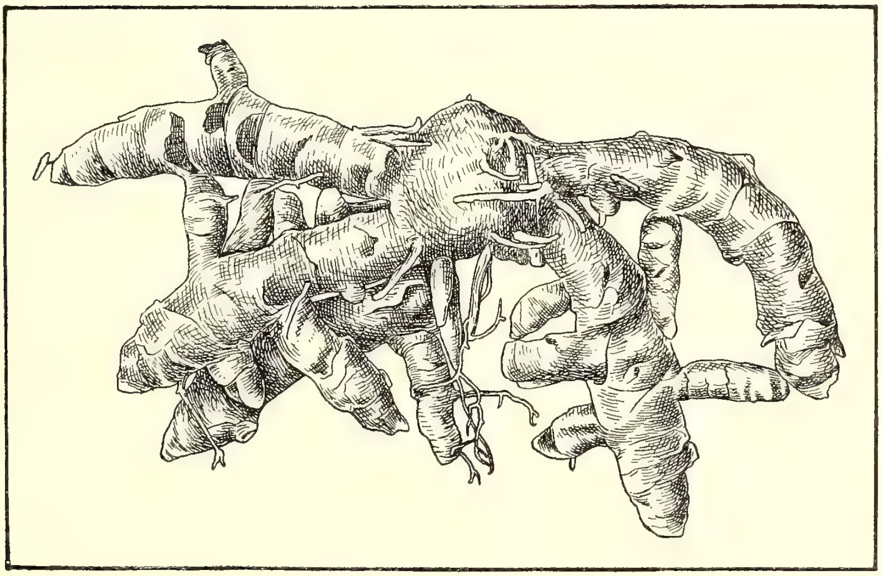


Fig. 1. *Curcuma colorata.*
Fig. 2. *Curcuma Heyneana.*

Plate VI.

Fig. 1. Rhizome of *Curcuma Mangga*, fig. A, purchased on the bazar, nat. s. Fig. B. and C. from a living plant, diminuted.

2, Rhizome complex of a luxurious growing plant of *C. Mangga* Much dimin.

Plate VI.

Fig. 1.

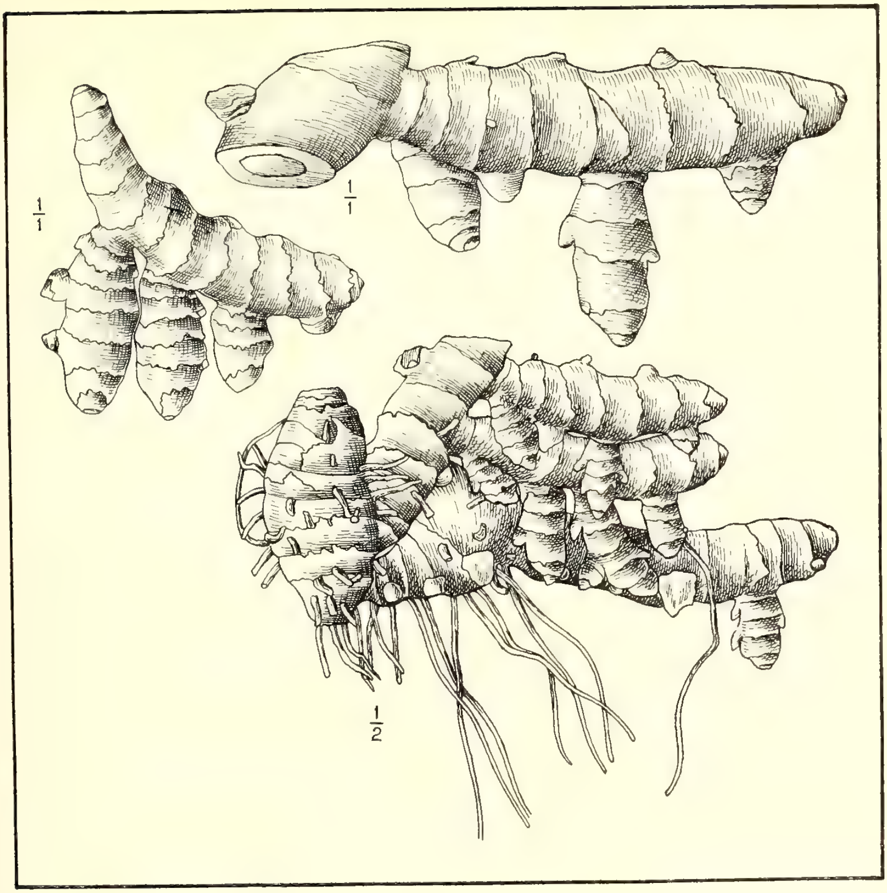
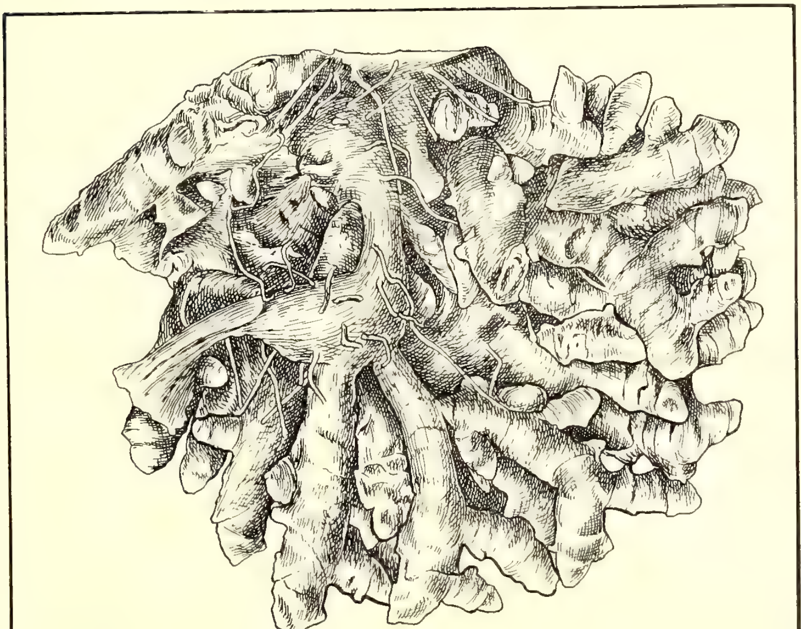


Fig. A.

Fig. B.

Fig. C.

Fig. 2.



Curcuma Mangga.

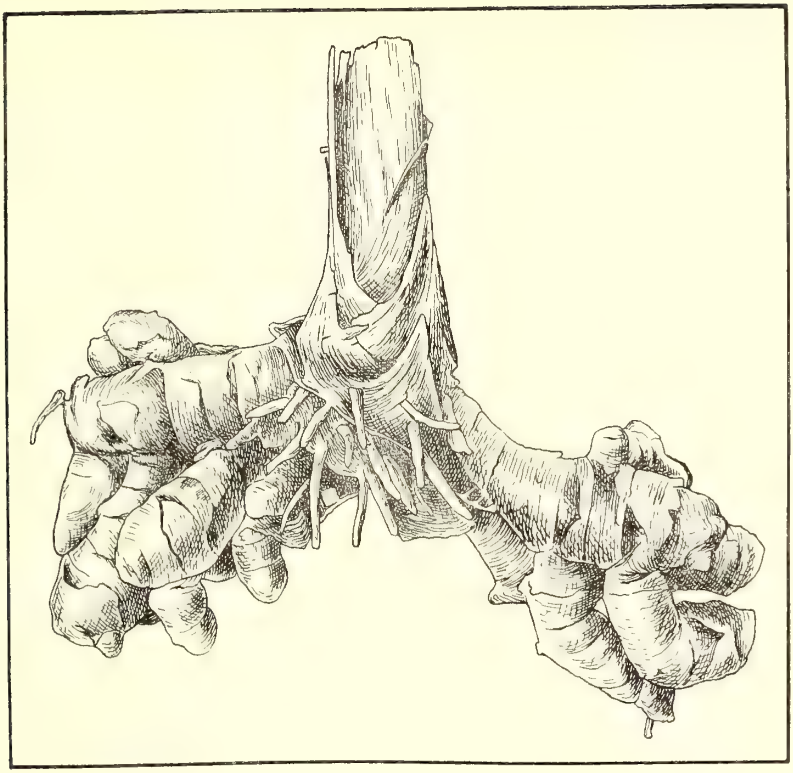
Plate VII.

Fig. 1. Rhizome complex of *Curcuma Zedoaria.*

2. Rhizome complex of *C. aeruginosa.*

Plate VII.

Fig. 1.



2.

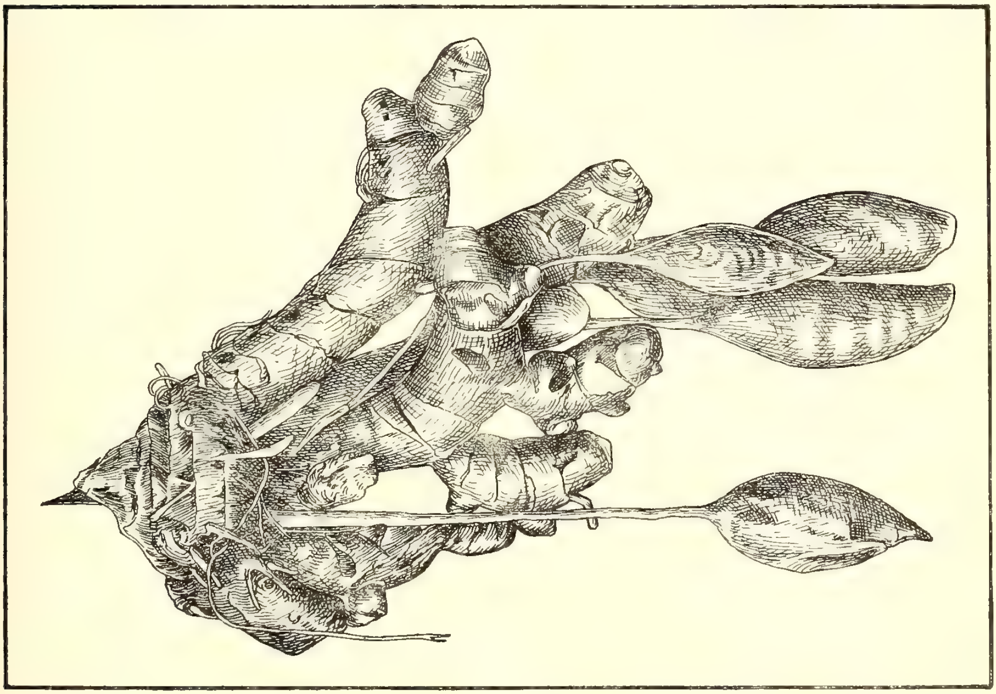


Fig. 1. *Curcuma Zedoaria.*
Fig. 2. *C. aeruginosa.*

Plate VIII.

Fig. 1. Rhizome complex of C. *xanthorhiza.*

2. Rhizome complex of C. *petiolata.*

Fig. 1.

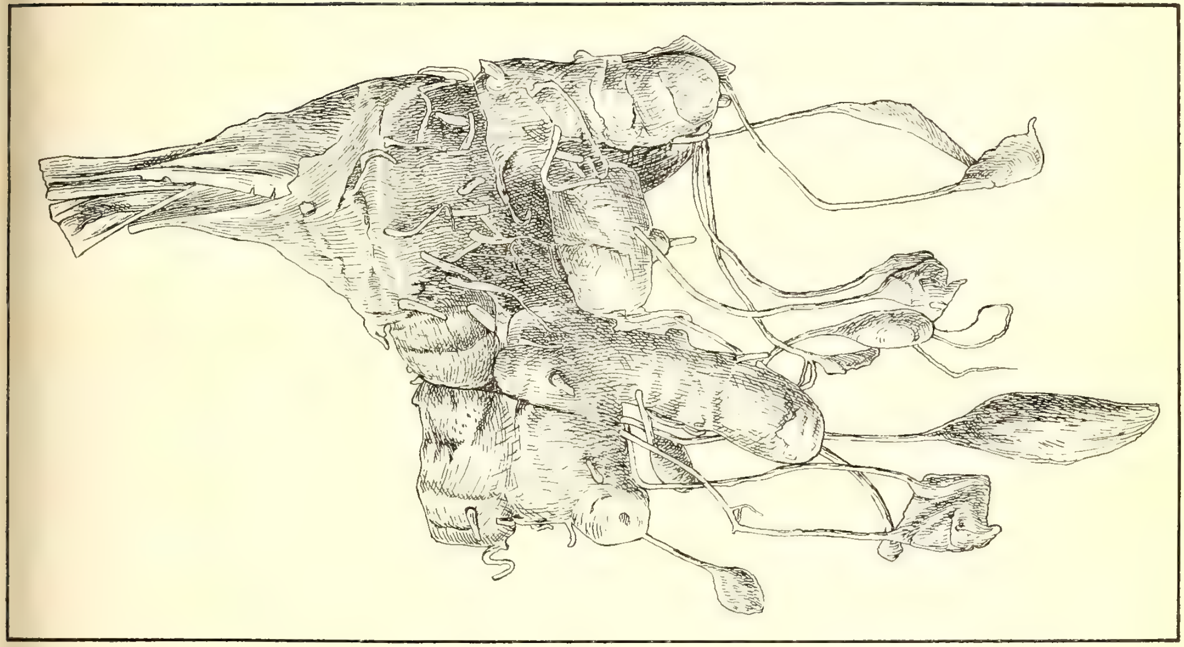


Fig. 2.

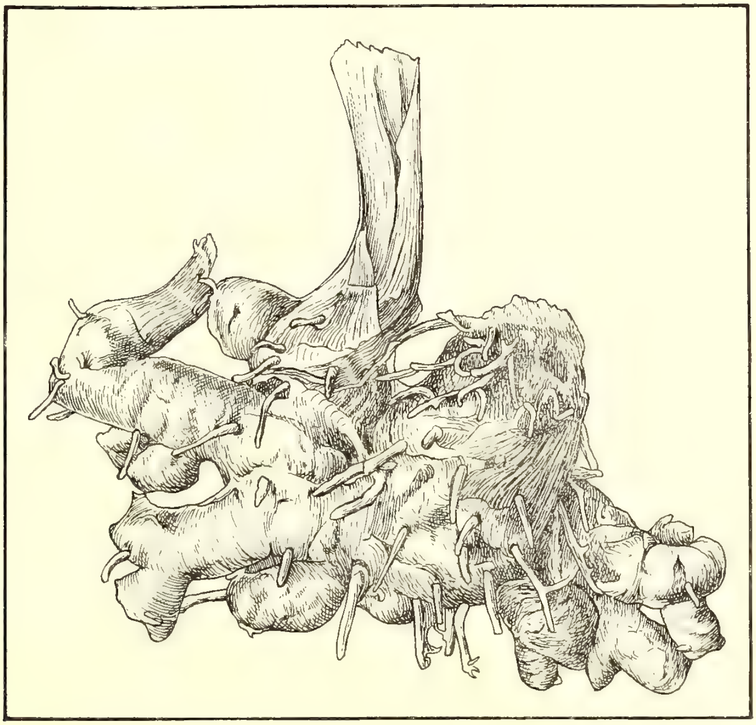
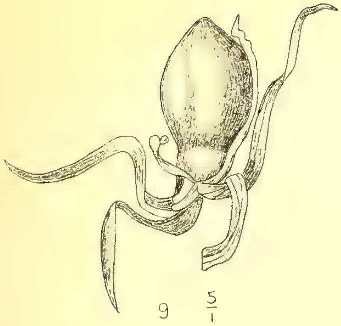


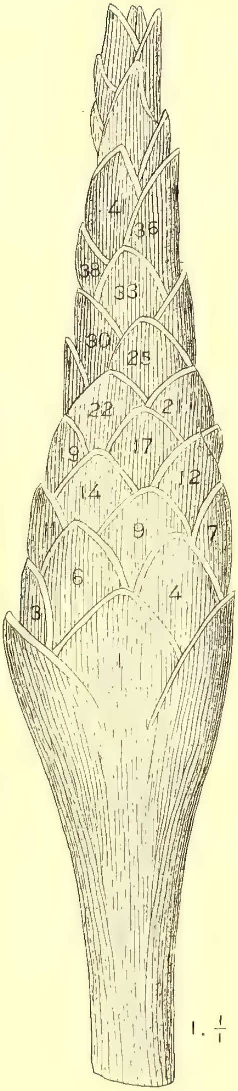
Fig. 1. *Curcuma xanthorhiza.*
Fig. 2. *Curcuma petiolata.*

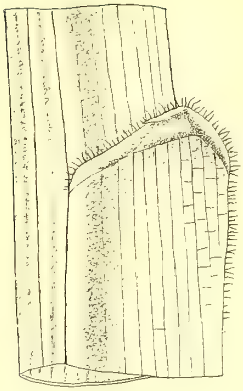
Plate IX.

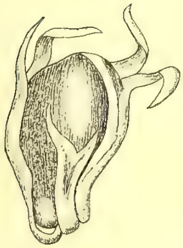
Fig. 1. *C. purpurascens,* young inflorescence, n. s.
2. *C. soloensis,* ligula, 2 × enl.
3. *C. soloensis*, the same, seen from the inner side.
4, 5. *C. zedoaria*, same n. s.
6. *C. aurantiaca,* the same n. s.
7. *C. aurantiaca*, Capsule 2 × nat size.
8. *C. aurantiaca*, seed, 5 × nat size.
9. *C. aurantiaca*, the same with expanded aril-lobes.

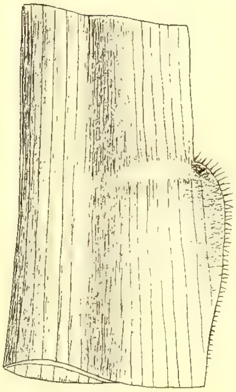
Plate IX.

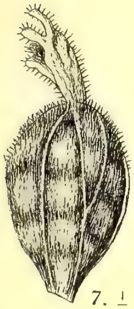

9 $\frac{5}{1}$

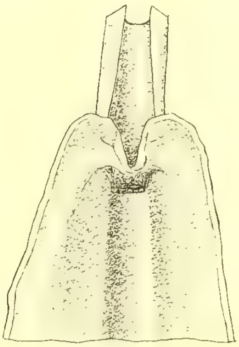

41
36
38
33
30
25
22
21
19
17
12
14
11
9
7
6
4
3
1
1. $\frac{1}{1}$

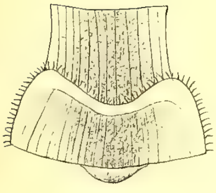

3. $\frac{2}{1}$

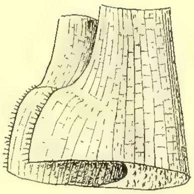

8. $\frac{5}{1}$


2. $\frac{2}{1}$


7. $\frac{1}{1}$


6 $\frac{1}{1}$


4. $\frac{1}{1}$


5. $\frac{1}{1}$

R. Natadipoera del.

M. Kromohardjo lith.

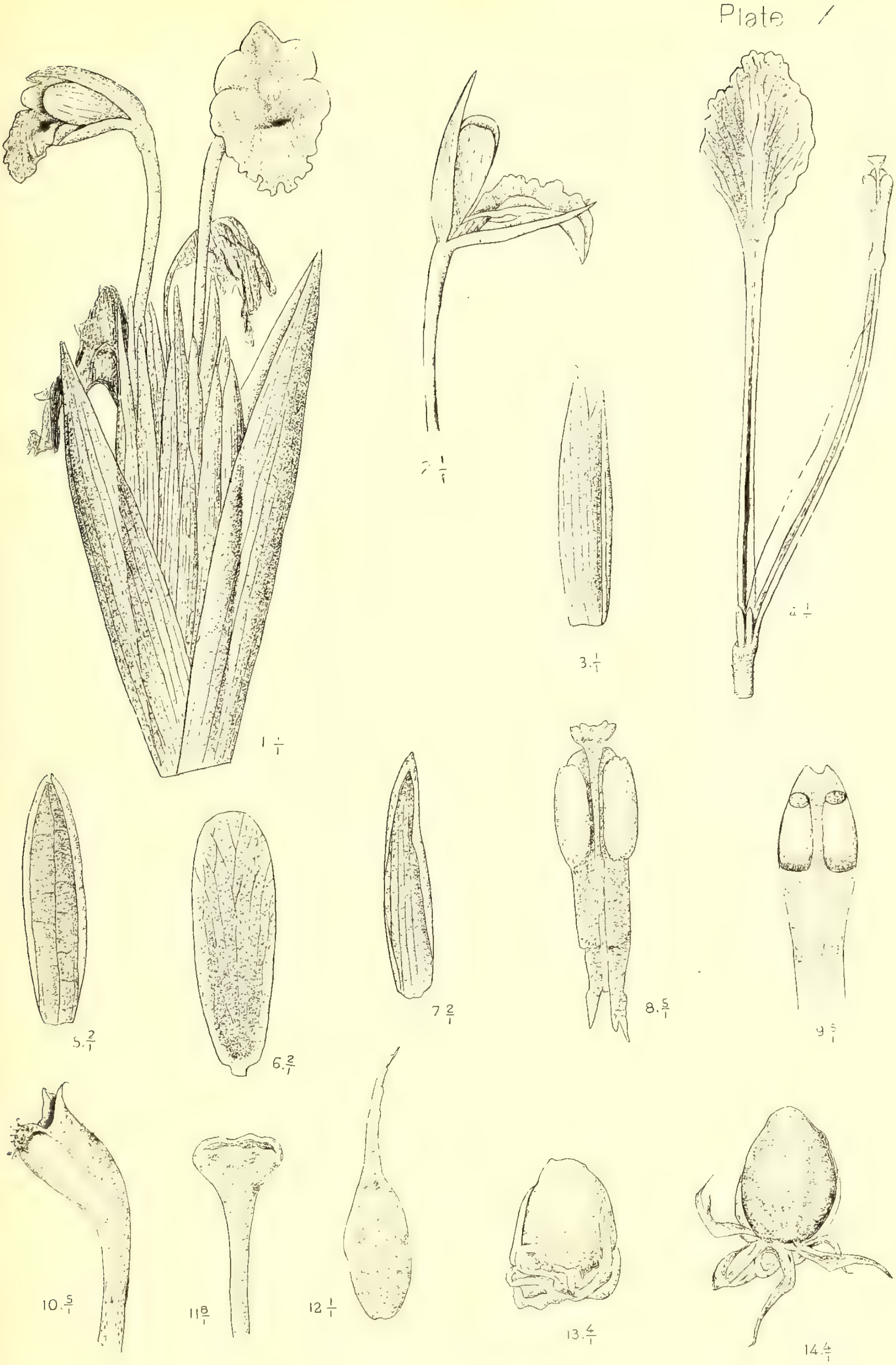
Curcuma spec. div.

Plate X.

Gastrochilus javanum K. Sch. (from a preserved inflorescence).

Fig. 1. Inflorescence, n. s.
2. Flower (in a living state).
5. Calyx.
4. Flower tube longitudinally split, with labellum and stamen.
5, 7. Petals, 2 × enl.
6. Staminode, 2 × enl.
Fig. 8.—10. Stamen 5/1. Fig. 8 shows the stigma and the anther bowed backward, Fig. 9 the anther from the face in its natural position, the pores are bent forward, Fig. 10 Anther, seen from side.
11. Stigma 6/1.
12. Capsule.
13, 14. Seeds.

Plate 1


1 1/1
2 1/1
3 1/1
4 1/1
5 2/1
6 2/1
7 2/1
8 5/1
9 5/1
10 5/1
11 8/1
12 1/1
13 4/1
14 4/1

R. Natadipoera del

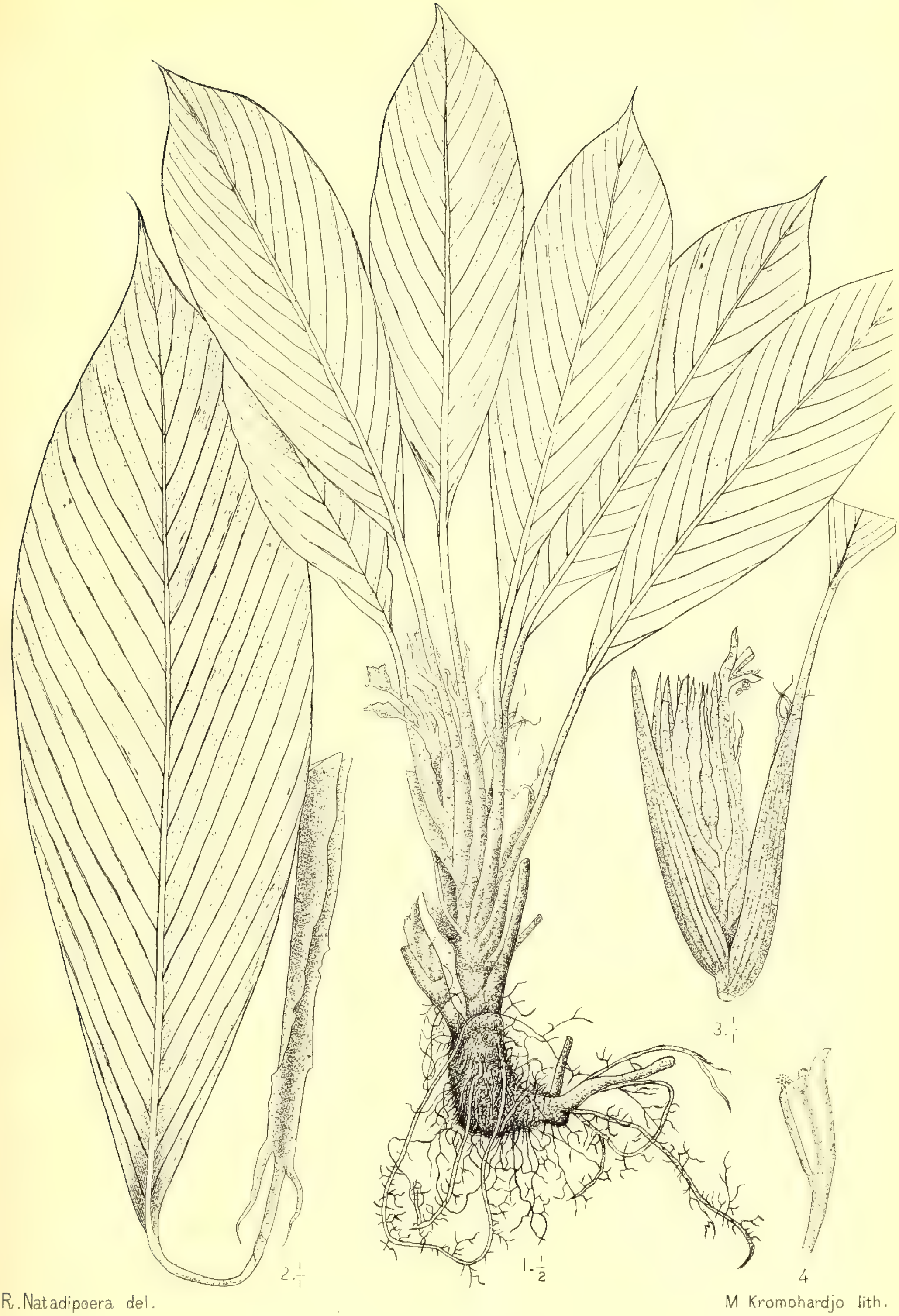
M. Kromohardjo lith

Gastrochilus javanum K. Sch.

Plate XI.

Gastrochilus apiculatum Val, (from herbarium).

Fig. 1. Flowering herb. 1/2.
2. Leaf 1/1 showing the ligula auricles.
3. Inflorescence, showing the unilateral axe by removing the sheaths.
4. Anther, enl.


2. $\frac{1}{1}$
1. $\frac{1}{2}$
3. $\frac{1}{1}$
4

R. Natadipoera del.

M Kromohardjo lith.

Gastrochilus apiculatum Val.

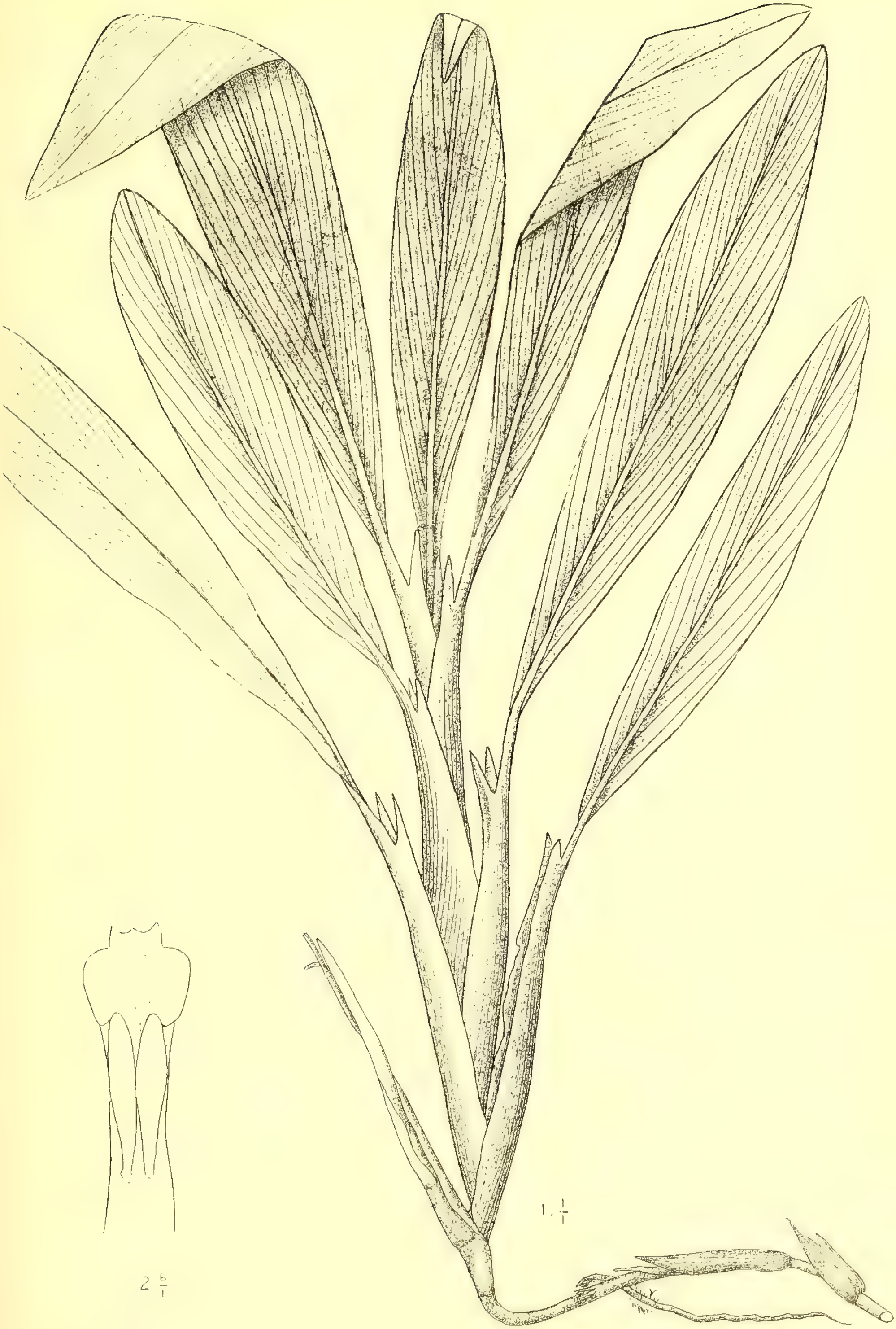
Plate XII.

Gastrochilus striatum Val., (from Herbarium).

Fig. 1. A young herb with part of the creeping stem.

2. Stamen, from a partly dishevelled flower, showing the parallel thecae and the crest.

Plate XII.



R. Natadipoera del.

M. Kremohardjo lith

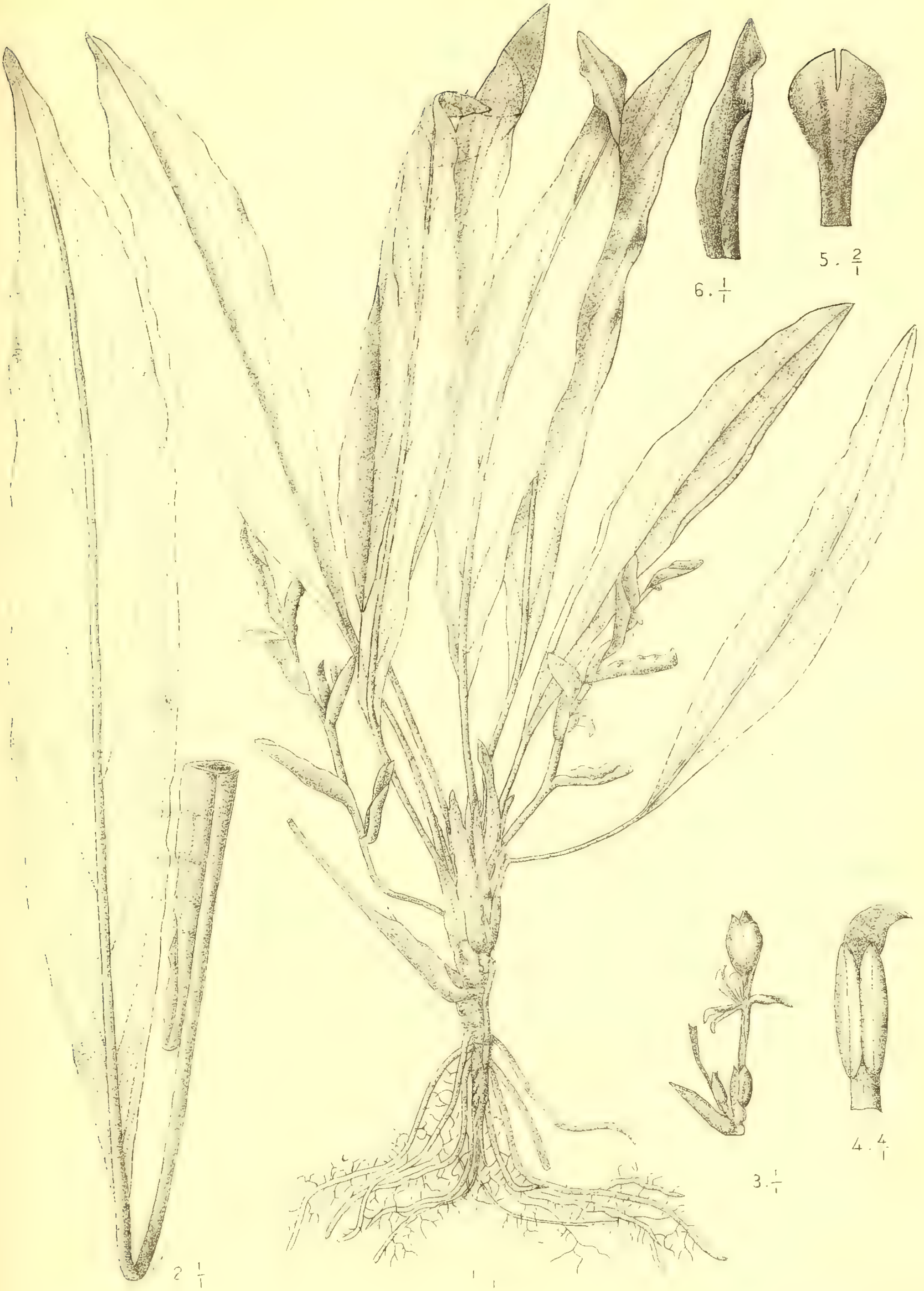
Gastrochilus striatum Val.

Plate XIII.

Gastrochilus laxiflorum Val., (from Herbarium).

Fig. 1. Facies, 1/2 nat. size.
2. Leaf 1/1.
3. Bract with 2 flowers, nat. size, the left one consisting of pedicel, calyx and part of the tube.
4. Stamen 4/1.
5. Labellum 2/1.
6. Bract, nat. size.

Plate. XIII.


6. 1/1
5. 2/1
2 1/1
1
3. 1/1
4. 4/1

R. Natadipoera del.

M. Kromohardjo lith.

Gastrochilus laxiflorum Val.

Plate XIV.

Gastrochilus Kunstleri (Baker) Val.

Fig. 1. Habitus, from Herb, much diminuted.

2. Flower with bract and bracteoles (from preserved mat.), coroll-lobes bent down, showing stamen and staminodes, n. s.

3. Idem, outer bract removed.

4, 5. Limb of living flower, seen from the face and sideways, n. s.

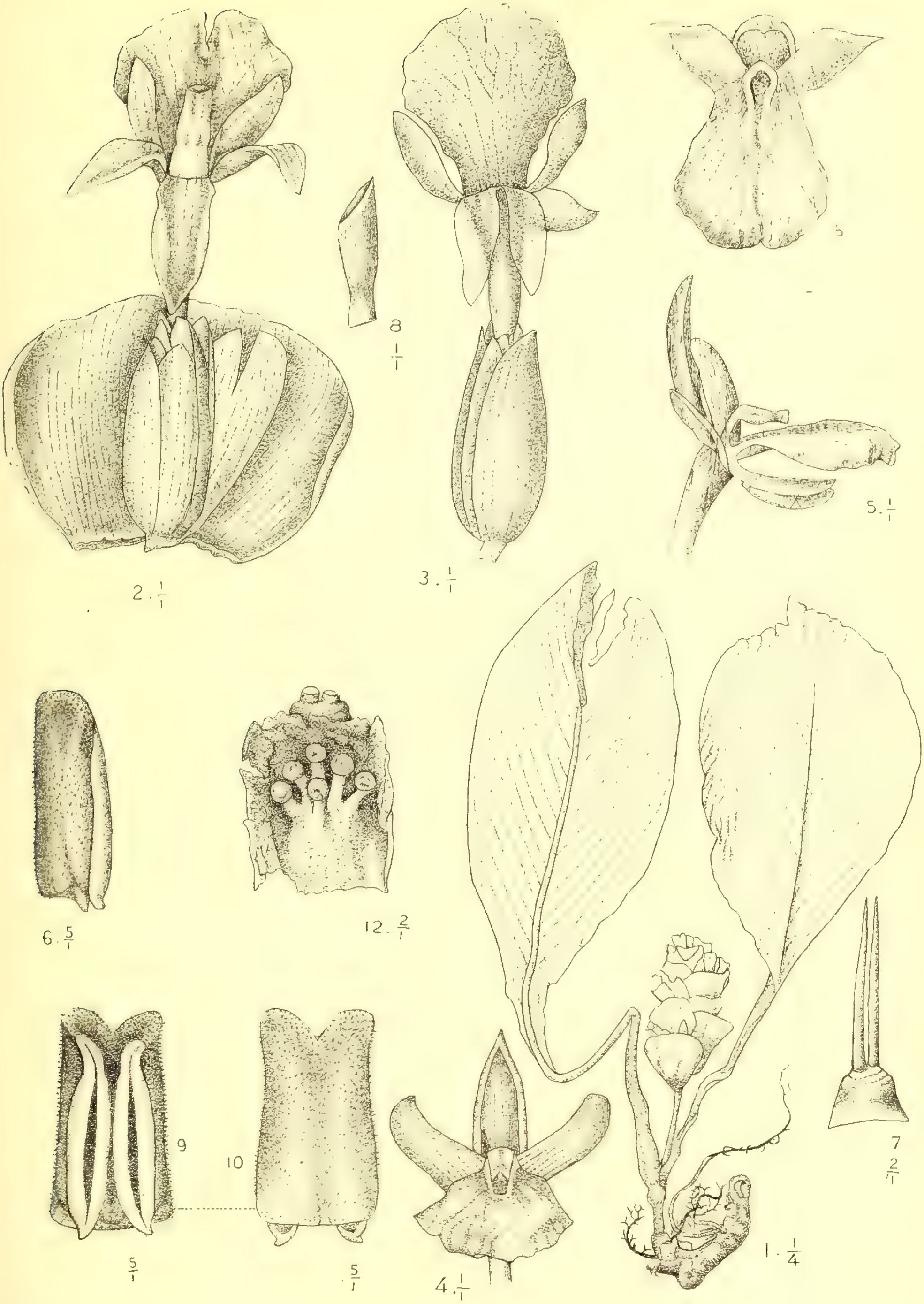
6. Lip of living flower seen from above, showing the furrow at the base, and the mouth of the faux, anther not pictured.

7. Stylodes 2 × enlarged.

8. Calyx.

9—11. Anther, enlarged 5 ×.

12. Placenta in an abnormal but often occurring one-celled ovarium, reminding *Haplochorema*.


2. 1/1
8 1/1
3. 1/1
5
5. 1/1
6. 5/1
12. 2/1
9
10
5/1
5/1
4. 1/1
1. 1/4
7 2/1

R. Natadipoera del.

M. Kromohardjo lith.

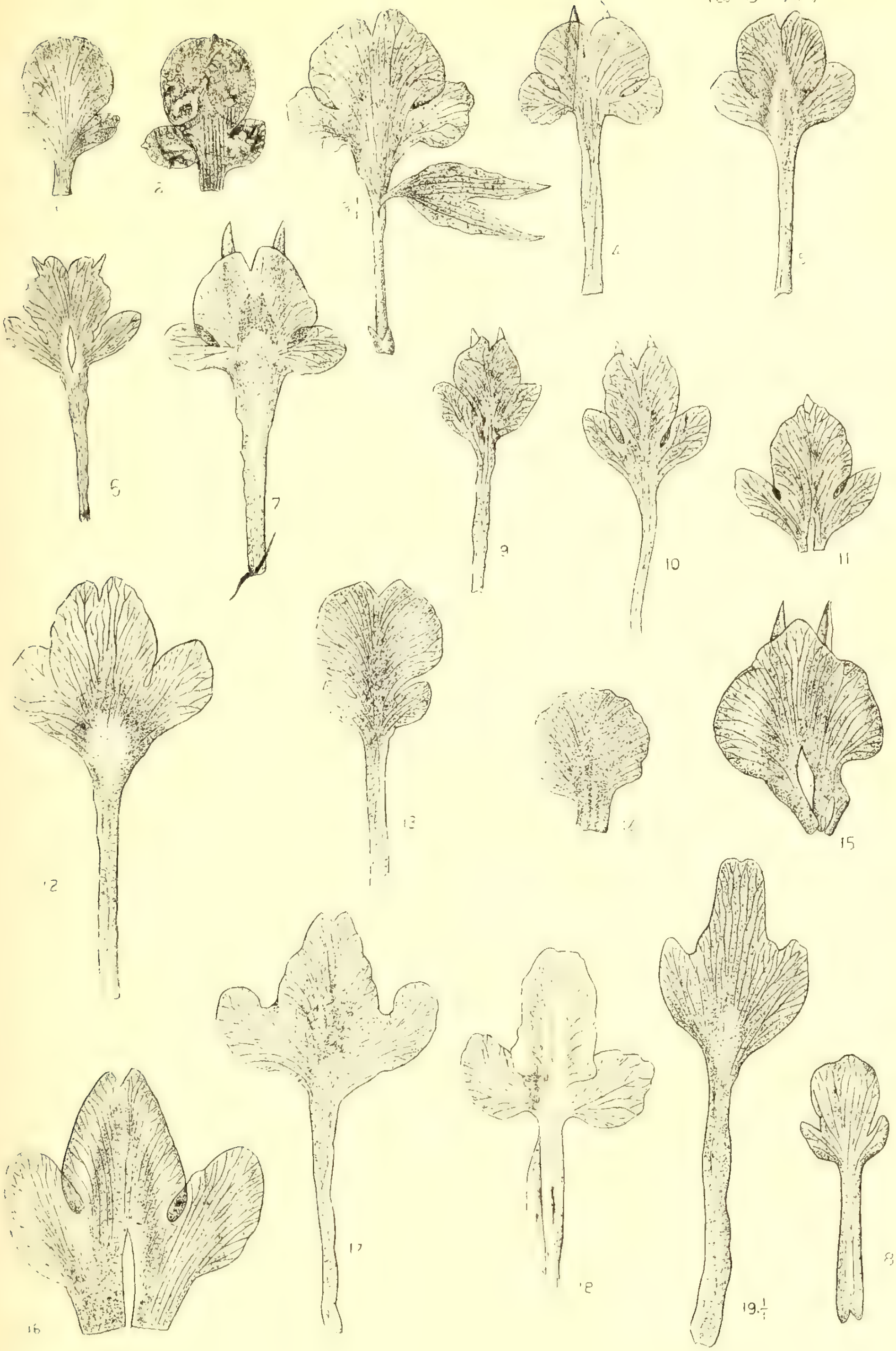
Curcuma (?) Kunstleri Baker.

Plate XV.

Outlines of labellum and staminodes in the genus ***Zingiber.*** All figures drawn from fresh flowers, explained and dried. N.s.

Fig. 1, 2. *Z. officinale.*
3. *Z. Zerumbet.*
4. *Z. aromaticum.*
5. *Z. aromaticum,* var. *sylvestris.*
6. *Z. amaricans,* var. *obscura.*
7. *Z. Zerumbet,* var. from Djogdjakarta.
9. *Z. amaricans.*
10. *Z. amaricans,* var. *major.*
11. *Z. amaricans,* flos bipetalus.
12. *Z. Ottensii.*
13. *Z. Cassumunar.*
14. *Z. gramineum.*
15. *Z. leptortachyum.*
16. *Z. macradenium.*
17. *Z. odoriferum.*
18. *Z. odoriferum,* var. *angustifolia.*
19. *Z. acuminatum.*
20. *Z. neglectum.*

Plate XV


1
2
3
4
5
6
7
9
10
11
12
13
14
15
16
17
18
19. 1/1
8

R. Natadipoera del

M. Kromohardjo lith

Plate XVI.

Zingiber zerumbet L. and *Z. macradenium.* Sch.

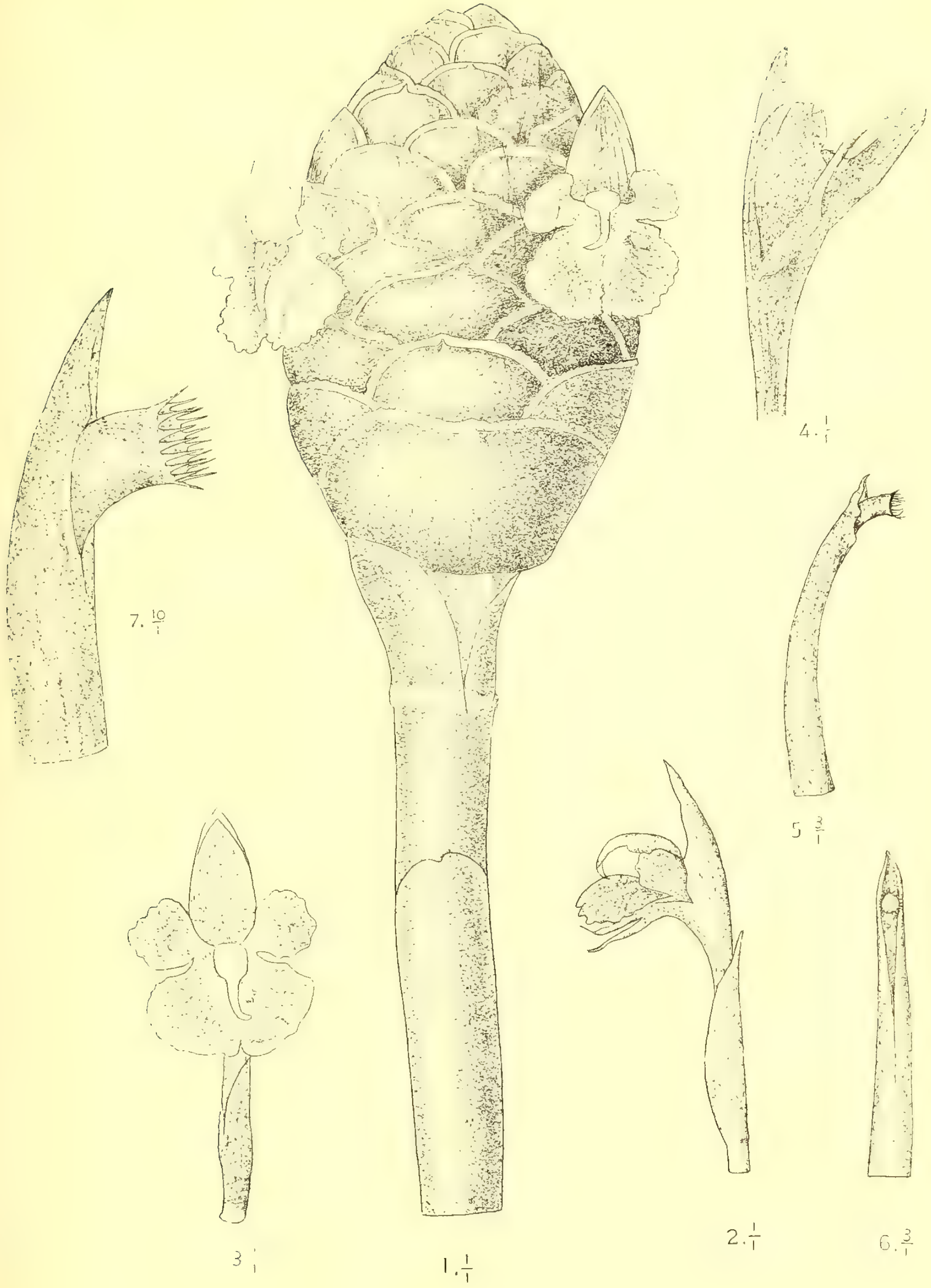
Fig. 1. Spike (from a culture in Bzg., stock from Timor).

2, 3. Flower, nat. size.

4. *Zingiber macradenium* K. Sch. Flower longitudinally dissected 1/1.

5, 6. Appendix of the anther with the stigma, enlarged.

7. Stigma much enl.


7. $\frac{10}{1}$
4. $\frac{1}{1}$
5 $\frac{3}{1}$
3 $\frac{1}{1}$
1. $\frac{1}{1}$
2. $\frac{1}{1}$
6. $\frac{3}{1}$

R.Natadipoera del.

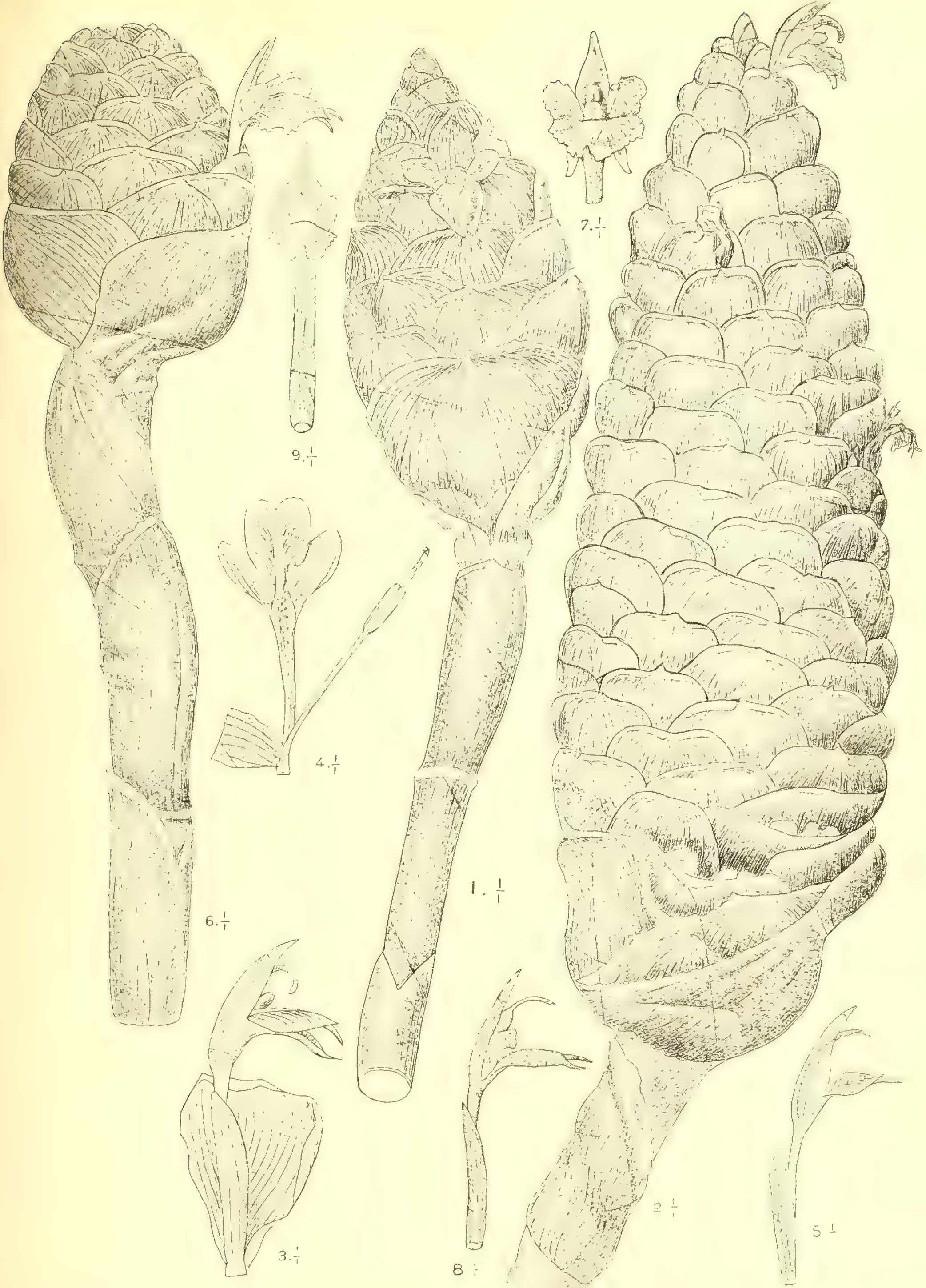
M.Kromohardjo lith.

1 – 3 Zingiber Zerumbet Sm.
4 – 7 " macradenia Sch.

Plate XVII.

Zingiber aromaticum Val. et *Z. amaricans* Bl.

Fig. 1. Spike of *Z. amaricans* var. *elongata.*
2. The same fruiting.
3. Bract with flower of the same.
4. Flower explained.
5. Bipetalous flower.
6. Spike of *Z. aromaticum* Val.
7. The same, flower from the face.
8, 9. Fl. of *Z. amaricans* Bl.


6. $\frac{1}{1}$
9. $\frac{1}{1}$
1. $\frac{1}{1}$
7. $\frac{1}{1}$
4. $\frac{1}{1}$
2 $\frac{1}{1}$
3. $\frac{1}{1}$
8 $\frac{1}{1}$
5 $\frac{1}{1}$

R. Natadipoera del [illegible]omohard.c [illegible]

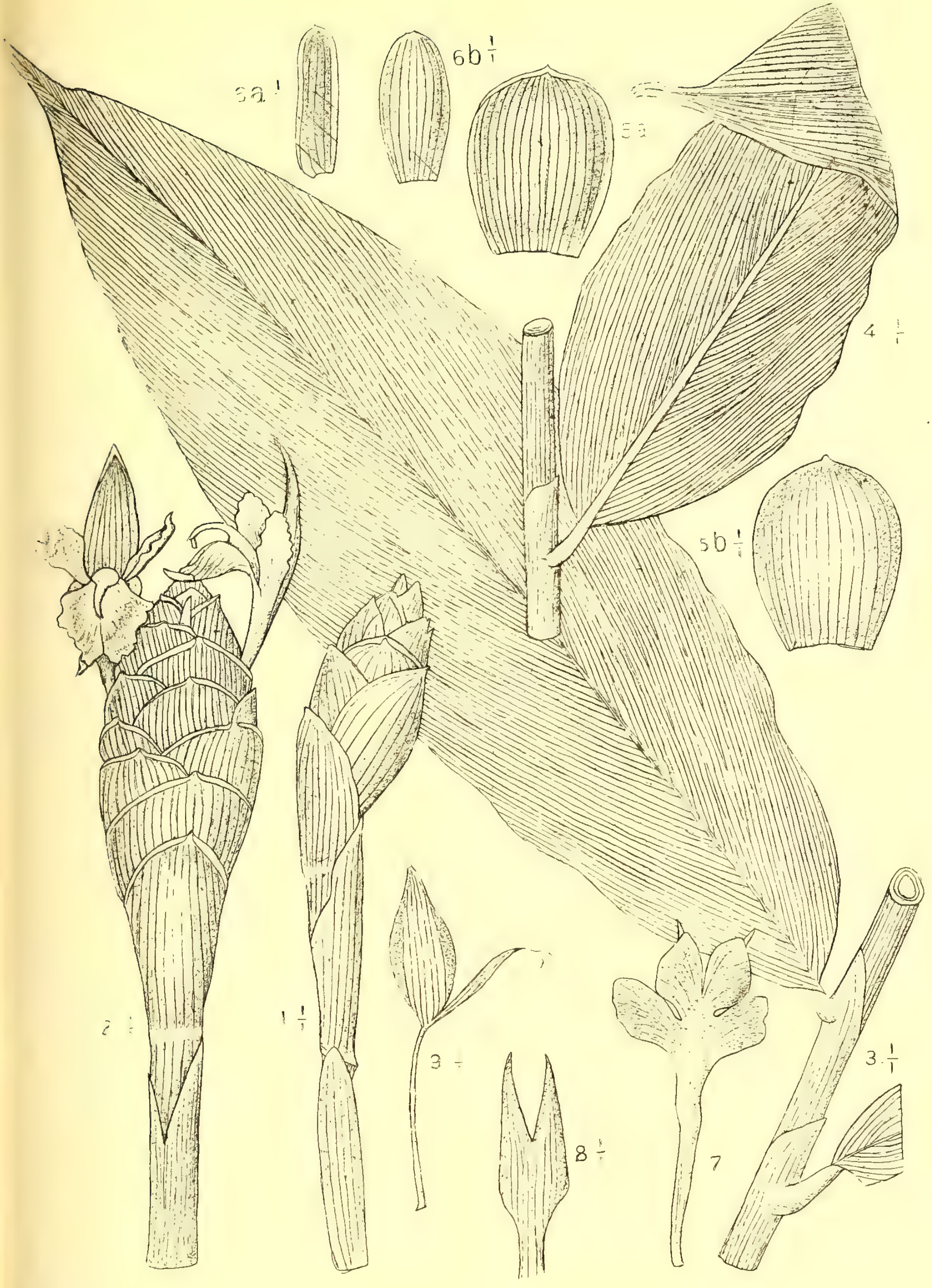
[illegible] Zingiber [illegible] Val.
1-5.8. [illegible]

Plate XVIII.

Zingiber papuanum Val.

Fig. 1. A young spike.
2. A flowering spike.
3, 4. Segments of the stem and leaves.
5*a*. A bract, inner side.
5*b*. A bract, outer side.
6*a*. Bracteole.
6*b*. The same explained.
7. Labellum and staminodes, explained.
8, 9. Petals and Stamen, dry.

Plate XVIII.



6a 1
6b 1/1
5a
4 1/1
5b 1/1
2 1/1
1 1/1
3 1/1
8 1/1
7
3 1/1

R. Natadipoera del.

M Kromohardjo lith.

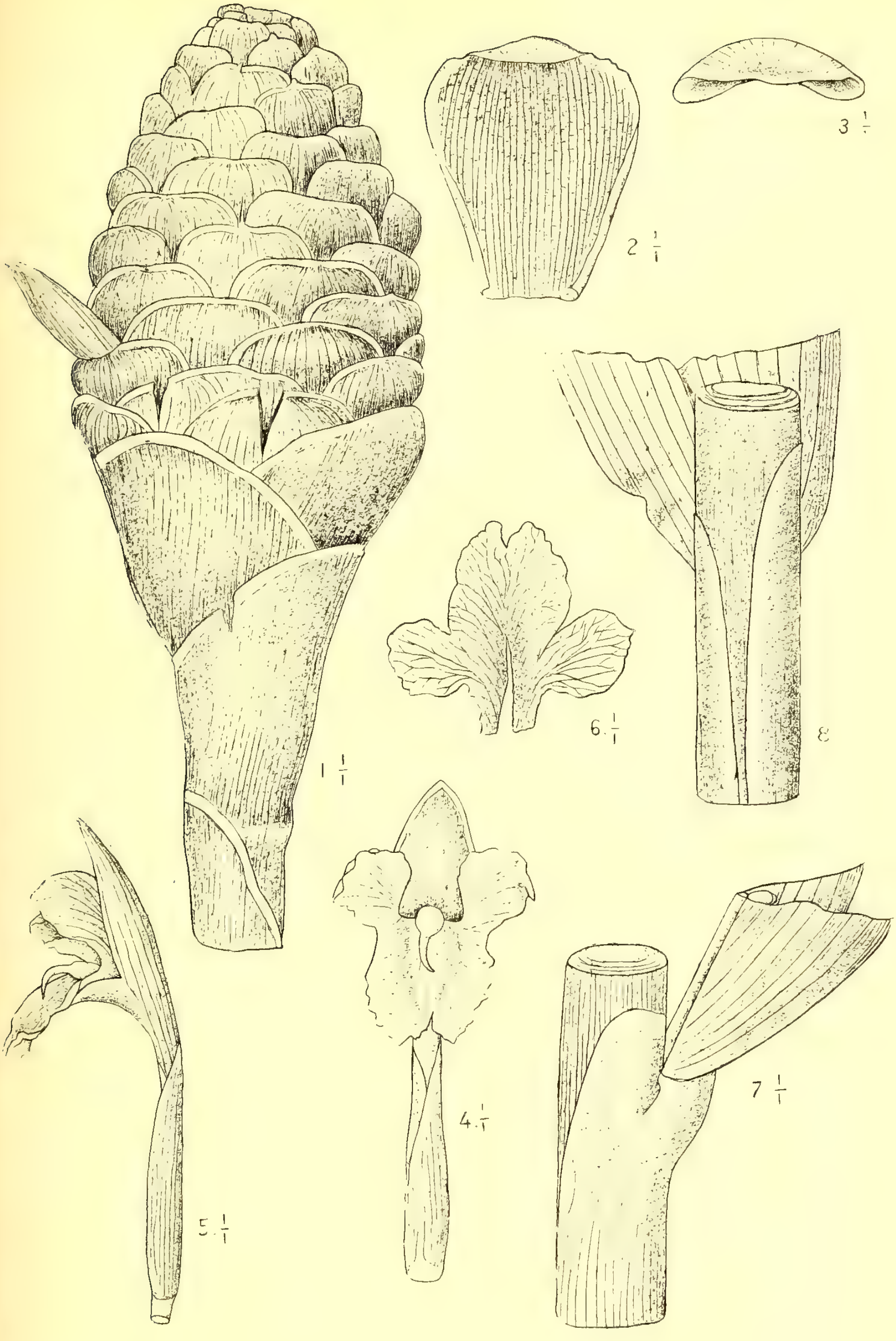
Zingiber papuanum Val

Plate XIX.

Zingiber Ottensii Val.

Fig. 1. Spike with a bud.
2. Bract from the inner side, showing the inflexed margin.
3. Bract from the top.
4, 5. Flower.
6. Labellum and Staminodes explained.
7, 8. Base of the leaf.

Plate XIX.


1 1/1
2 1/1
3 1/1
4 1/1
5 1/1
6 1/1
7 1/1
8

R. Natadipoera del

M. Kromohardjo lith

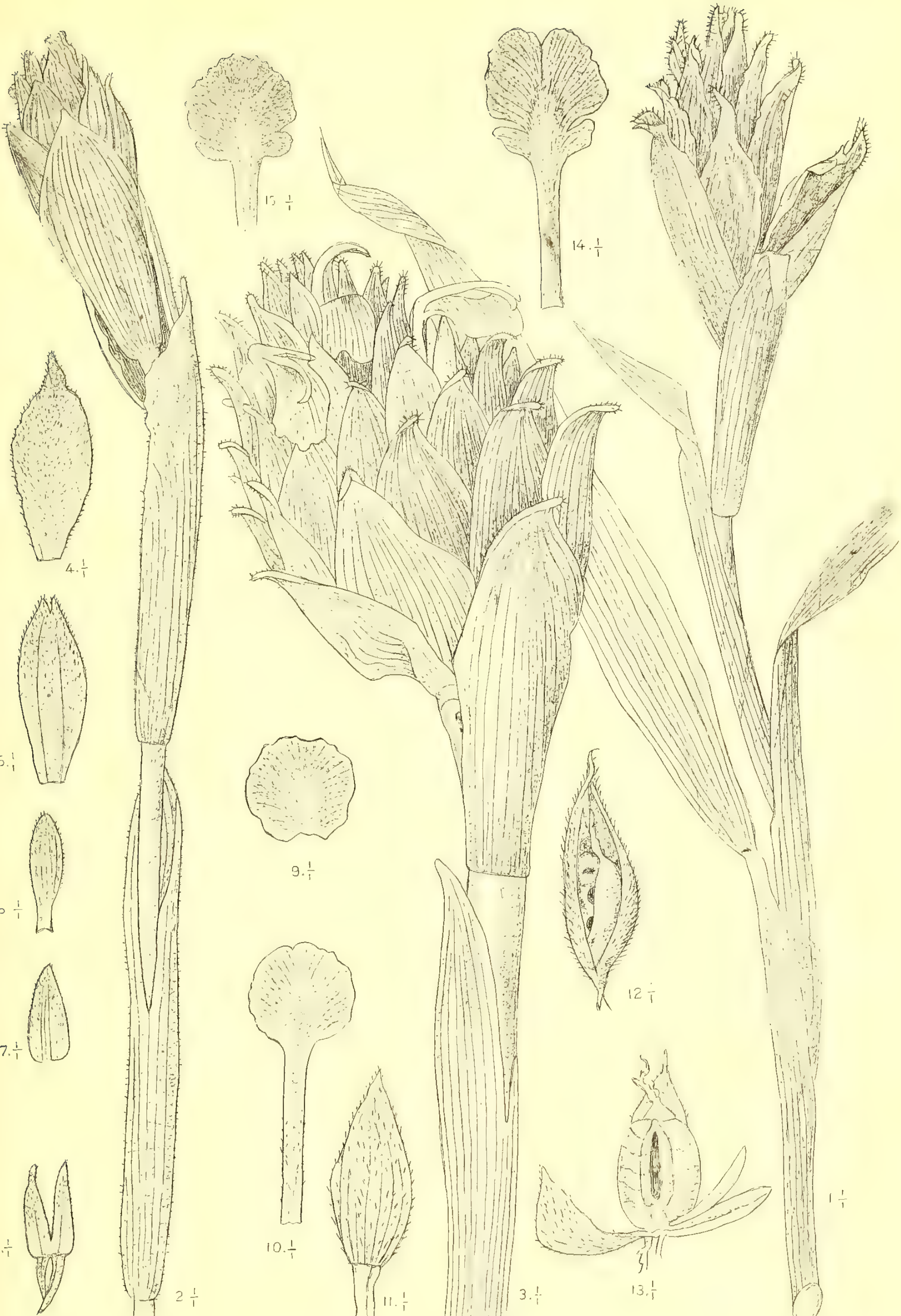
Zingiber ottensii Val.

Plate XX.

Zingiber gramineum Bl. (Fig. 1—13 et 15).
Z. Cassumunar Roxb. (Fig. 14).

Fig. 1. Terminal spike, fruiting, forma genuina.
2. Lateral spike, young forma genuina.
3. Forma robusta, lateral spike.
4. Bract.
5. Bracteole.
6. Calyx.
7, 8. Petala.
9, 10. Labellum, (staminodes connate).
11—13. Capsula.
14. *Zingiber Cassumunar.* Labellum and Staminodes.
15. Labellum of forma robusta, explained.

Plate XX


15. 1/1
14. 1/1
4. 1/1
5. 1/1
6. 1/1
7. 1/1
8. 1/1
2. 1/1
9. 1/1
10. 1/1
11. 1/1
3. 1/1
12. 1/1
13. 1/1
1. 1/1

R. Natadipoera del.

M. Kromohardjo lith.

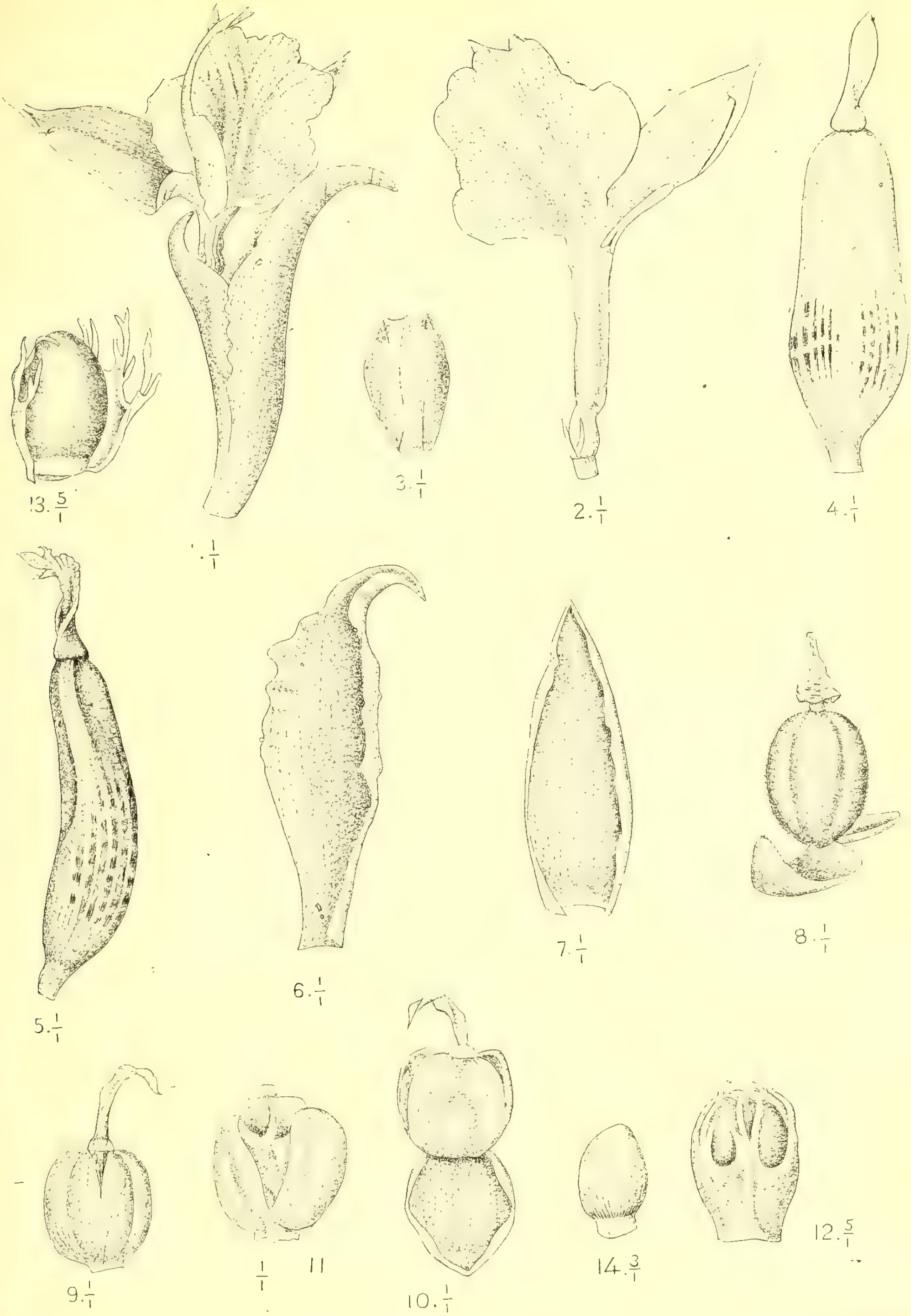
Zingiber gramineum Bl.

Plate XXI.

Zingiber Loerzingii.

Fig. 1. Flower enclosed in the bract and bracteola (laid open, from preserved specimen).
2. Fl. laid open and dried (stamen crumpled).
3. Calyx.
4, 5. Capsule, young, preserved on alcohol.
6, 7. Bracts.
8. Capsule of *Z. gramineum.*
9—11. Capsule of *Z. aromaticum.*
12. Seed of *Z. Loerzingii.*

Plate XXI.

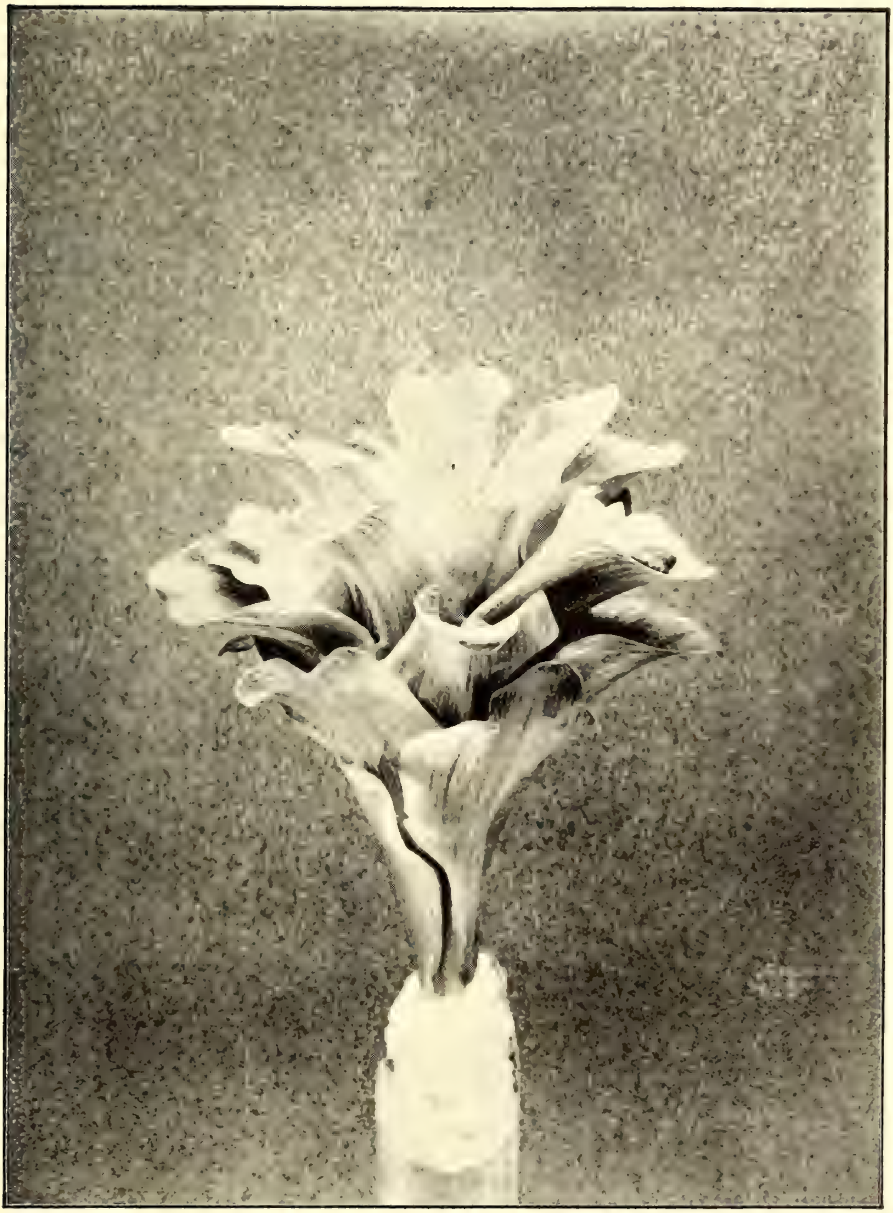

13. $\frac{5}{1}$
1. $\frac{1}{1}$
3. $\frac{1}{1}$
2. $\frac{1}{1}$
4. $\frac{1}{1}$
5. $\frac{1}{1}$
6. $\frac{1}{1}$
7. $\frac{1}{1}$
8. $\frac{1}{1}$
9. $\frac{1}{1}$
11 $\frac{1}{1}$
10. $\frac{1}{1}$
14. $\frac{3}{1}$
12. $\frac{5}{1}$

R.Natadipoera del.

M.Kromohardjo lith.

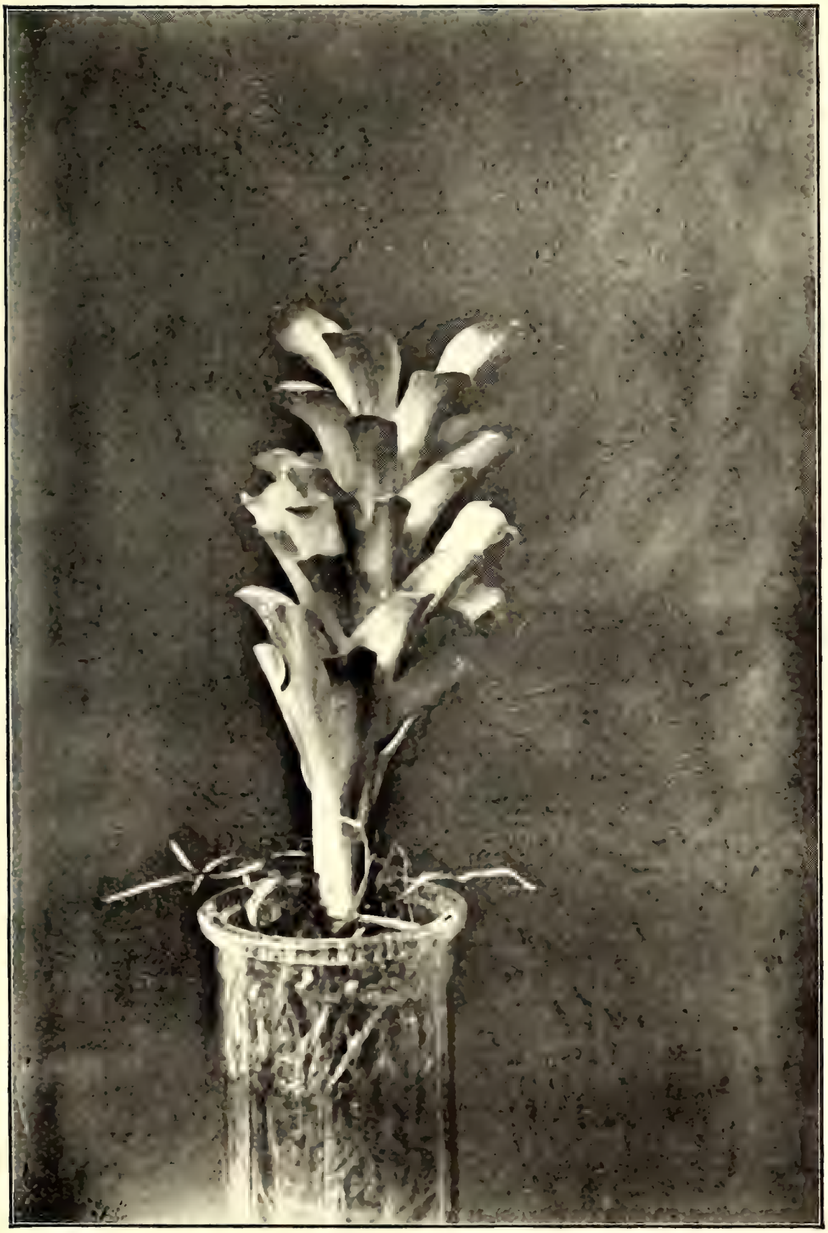
Zingiber spec. div.

Plate XXII. Infl. of *Curcuma domestica* Val. from a very poor, rather abnormal, specimen grown from rhizomes of „*kunyit*" sent from Singapore, Fl. Sept. 1917. The figure is rather different from the normal type, by the very short spike, and the living spike is peculiar by the greenish white tinge of the coma. The flowers are however quite similar to that of the Java specimens, even in the characteristic spurs, and the very long free parts of the bracts are typical.



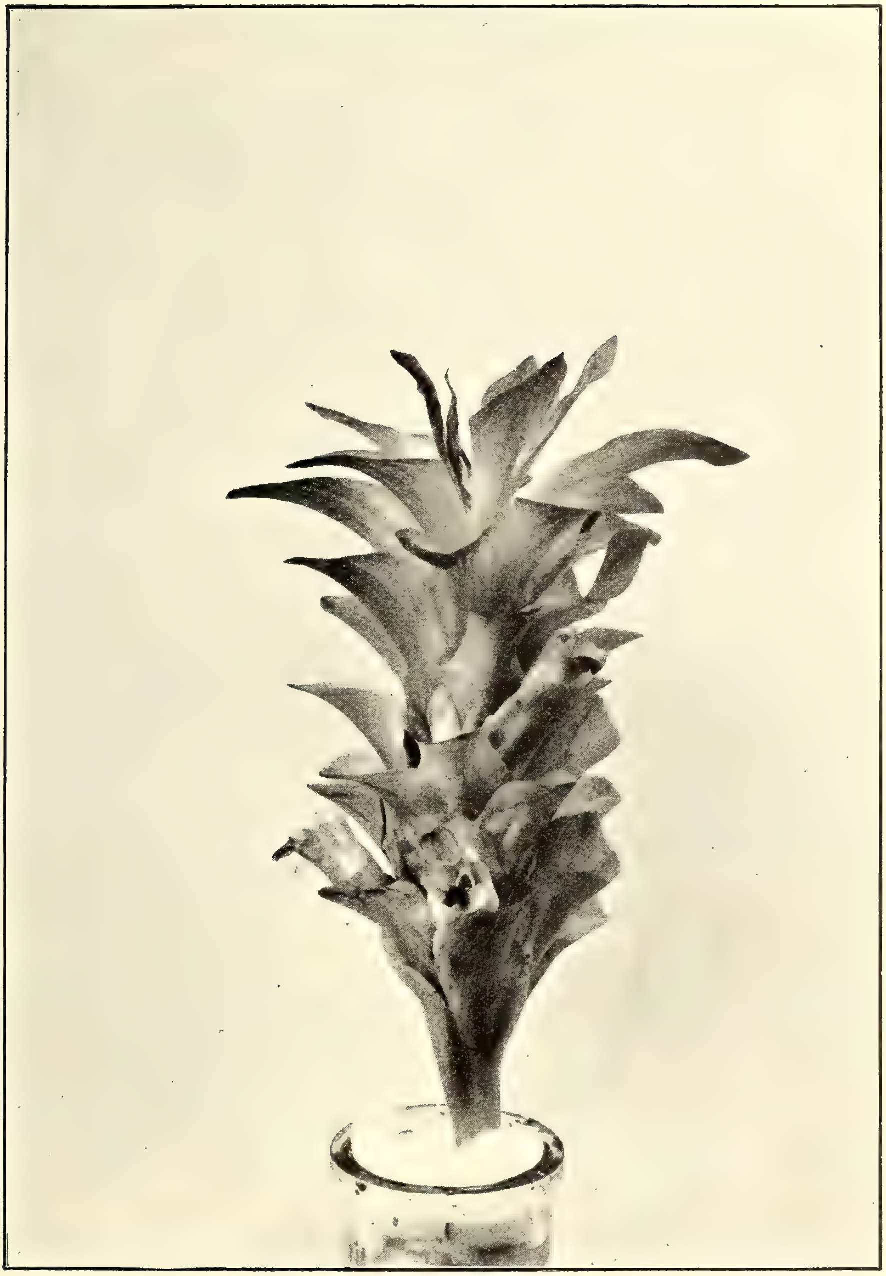
Curcuma domestica Val.
(*Curcuma longa Koenig*).

Plate XXIII. Infl. of *C. purpurascens,* Bl. from a very young plant; in strong growths, in normal specimens the infl. has at least the double size and fullness.



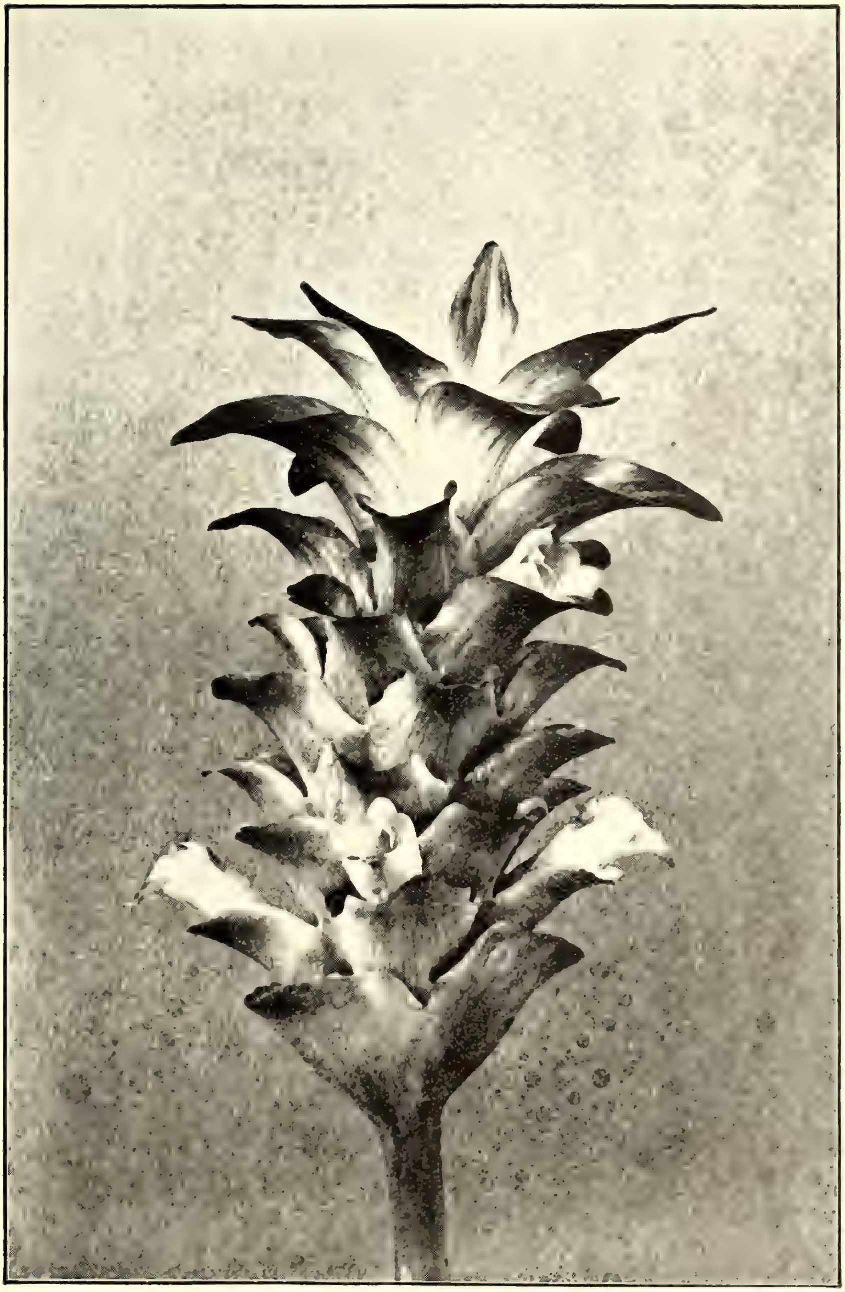
Curcuma purpurascens Bl.

Plate XXIV. Infl. of *C. Brog* Val., much dim.



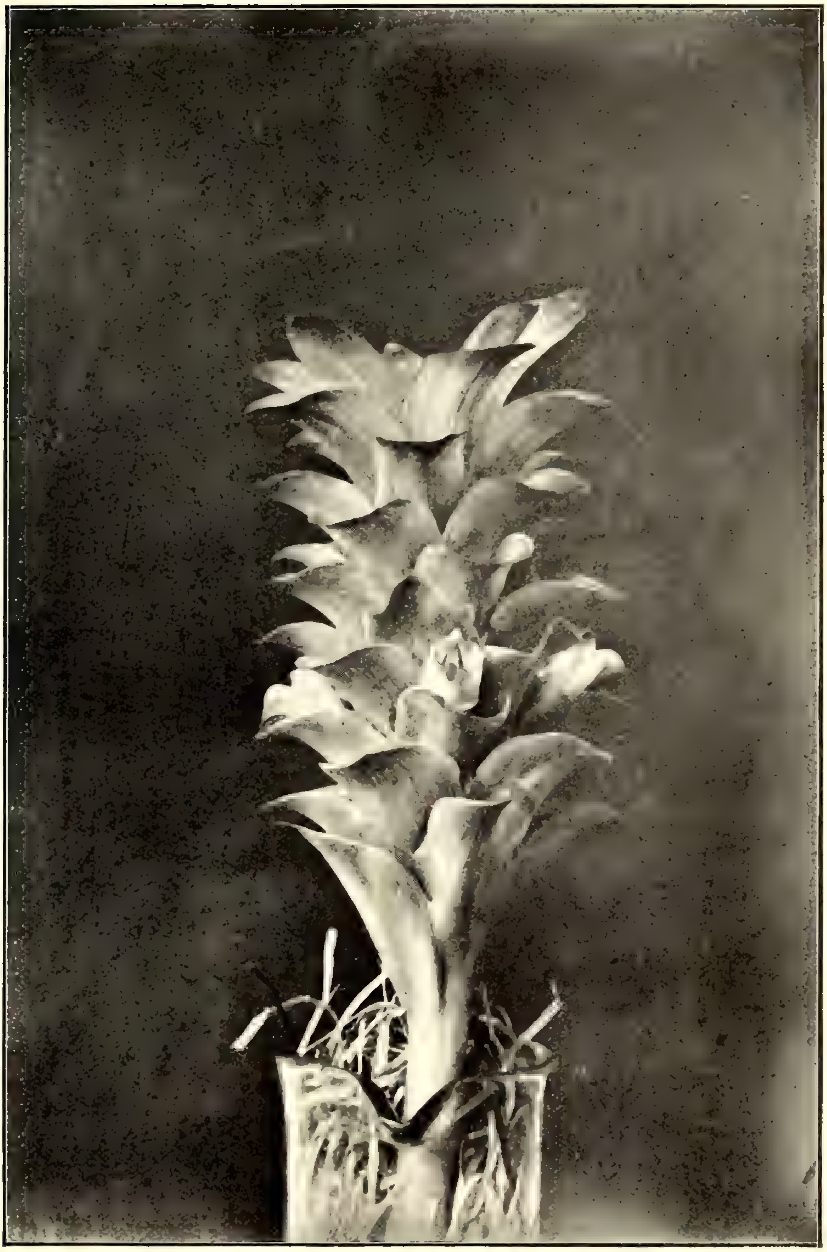
Curcuma Brog Val.

Plate XXV. Infl. of *C. colorata* Val. $^1/_2$ dim.



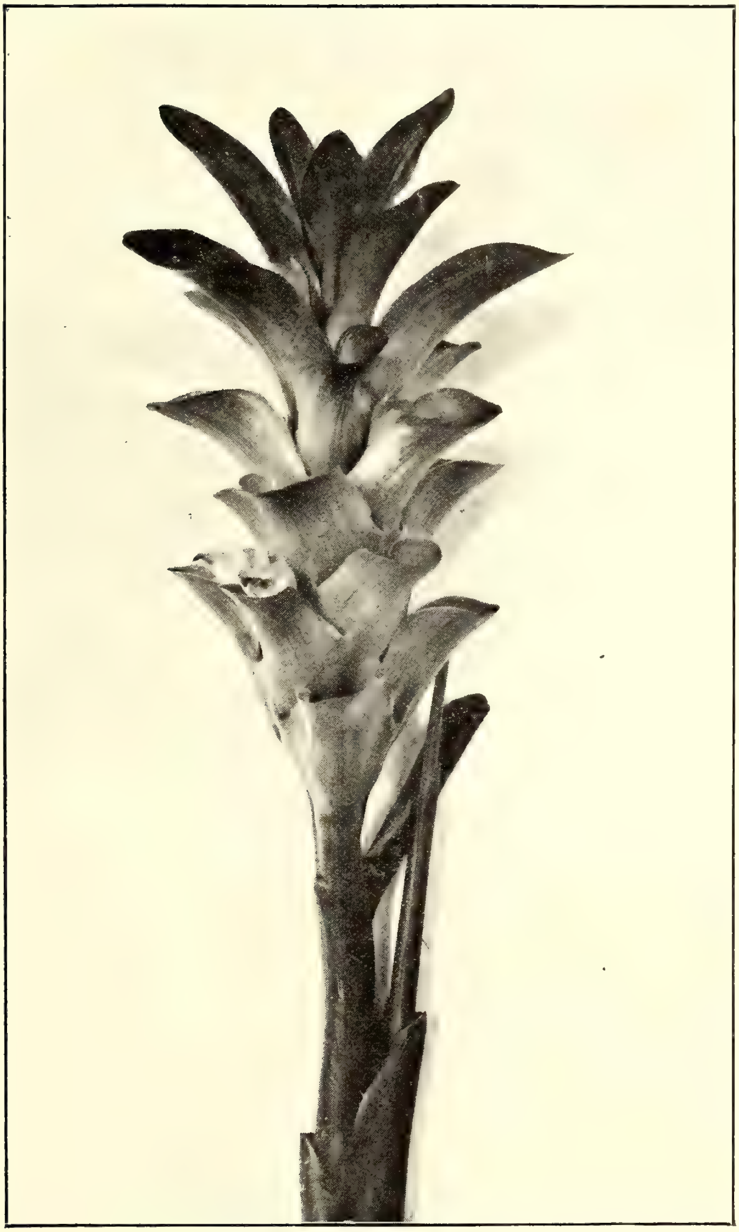
Curcuma colorata Val.

Plate XXVI. Infl. of *C. euchroma* Val.



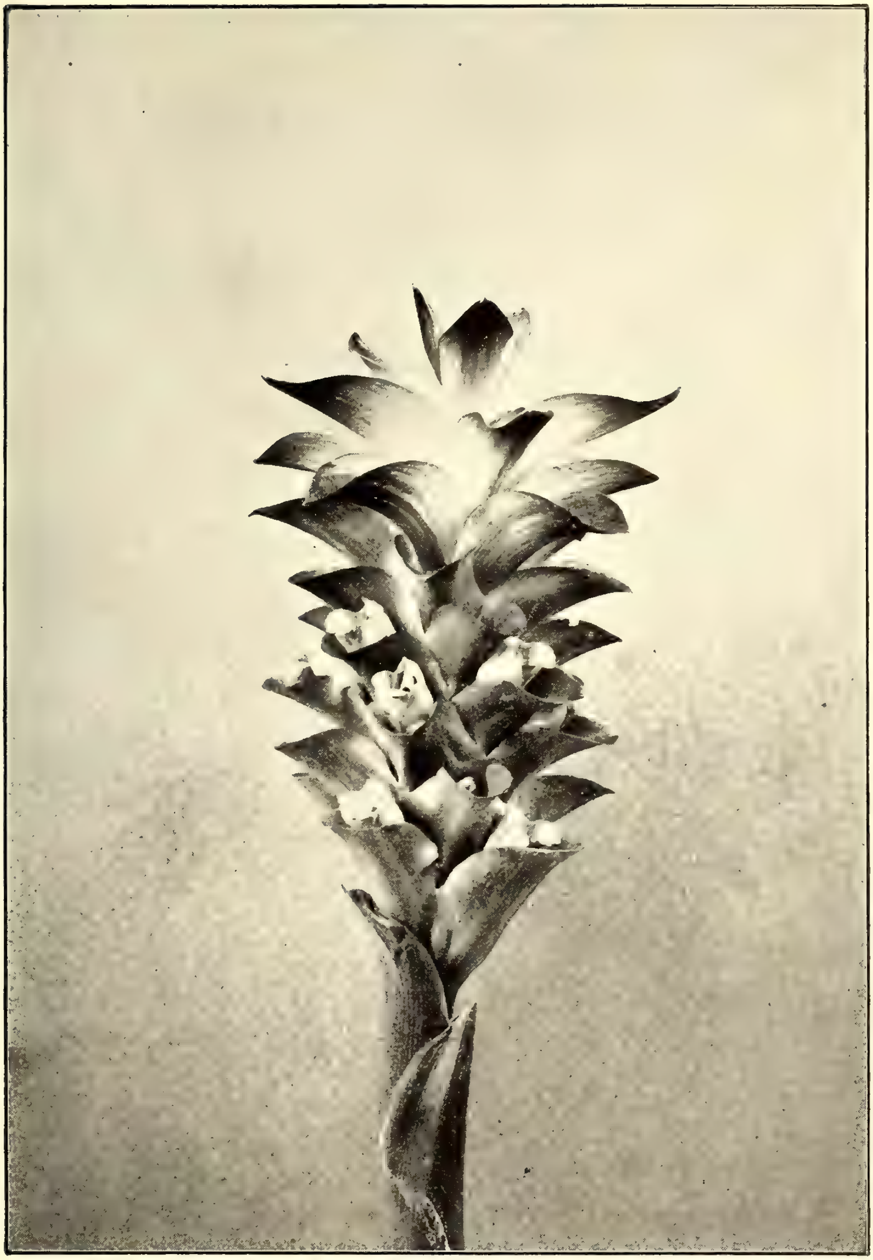
Curcuma euchroma Val.

Plate XXVII. Infl. of *C. Zedoaria* Rosc. (Photographed by Mr. v. ZIJP from a Batavian cultivated specimen).



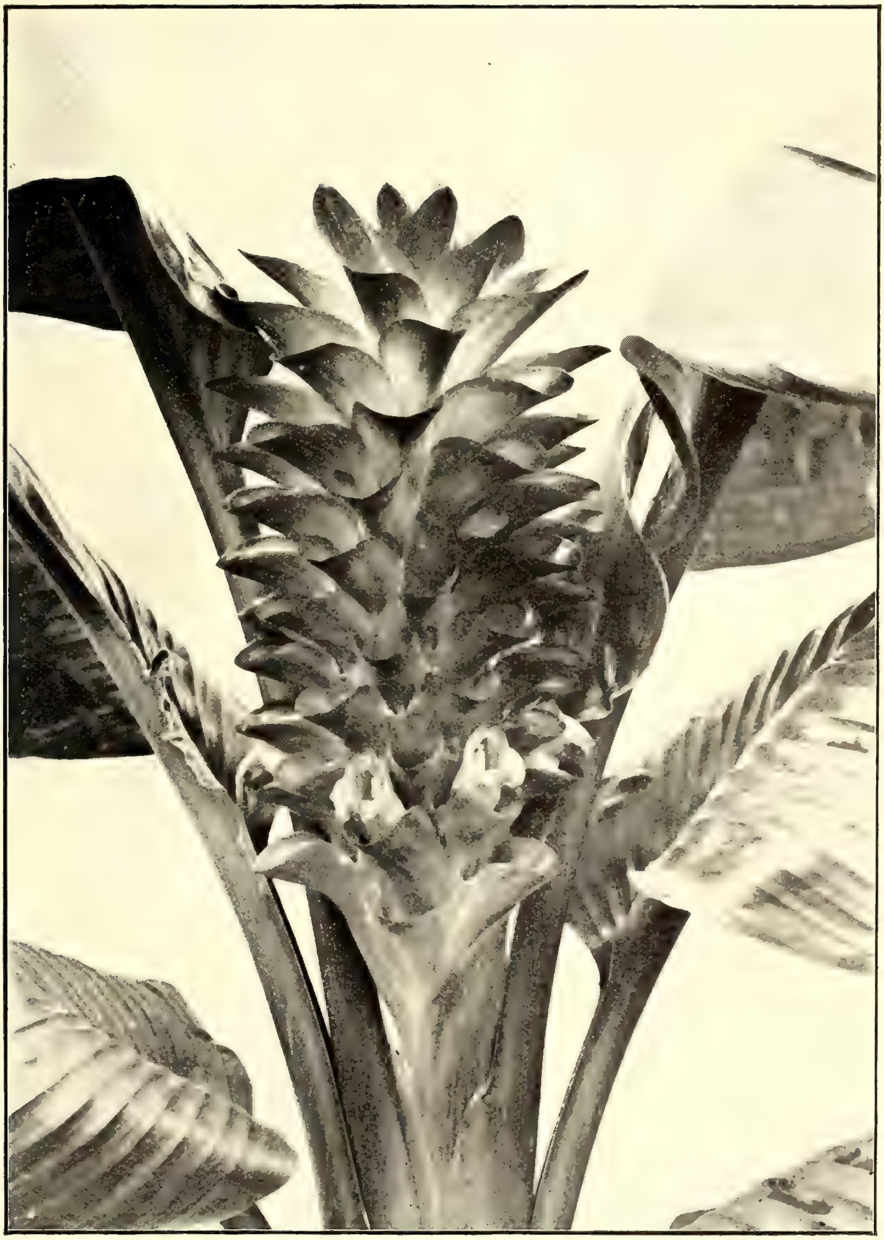
Curcuma Zedoaria Rosc.

Plate XXVIII. Infl. of *C. xanthorhiza* Roxb.



Curcuma xanthorhiza Roxb.

Plate XXIX. Infl. of *C. petiolata* Roxb.

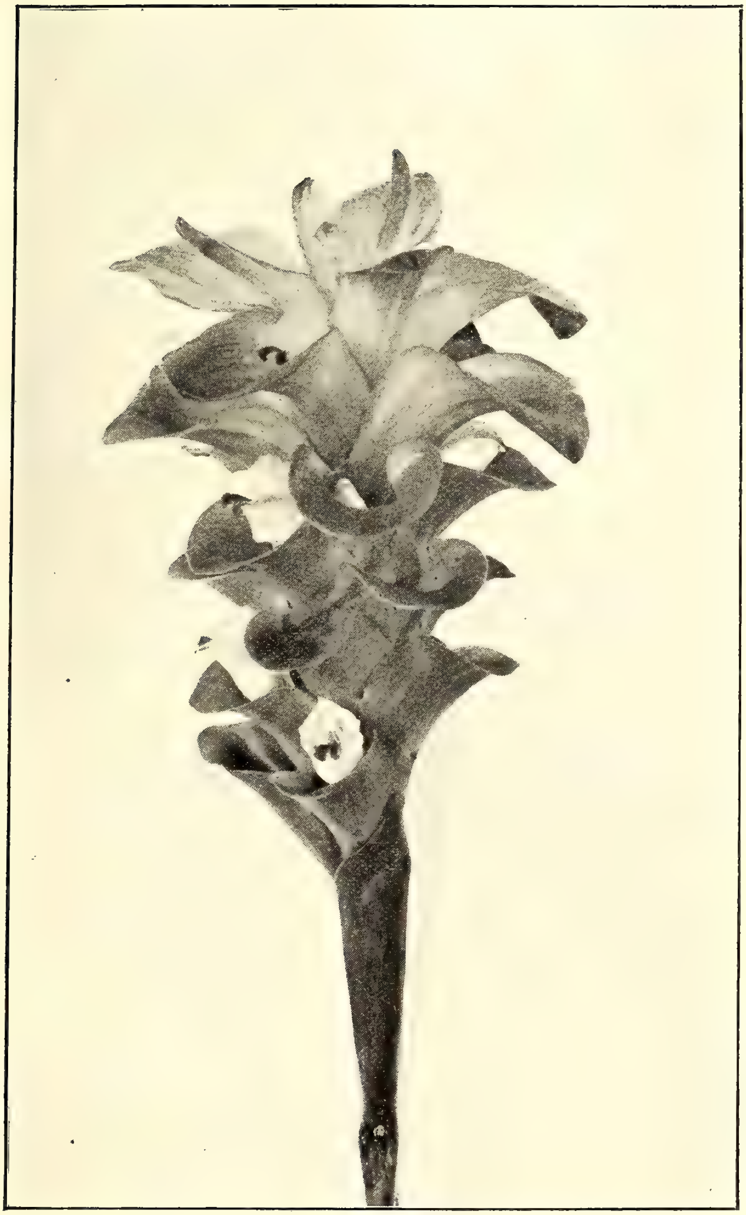


Curcuma petiolata Roxb.

Plate XXX. Infl. of *C. Mangga* var. *sylvestris.* (see p. 53) Photographed by Mr. VAN ZIJP from a plant, called *temu putih* in Malang.

Mr. v. ZIJP believes this specimen rather to belong to *C. Zedoaria* than to *C. Mangga,* considering growth, colour and odour of the rhizomes. Though he is quite right as to the rhizomes, I am of opinion that the structure of flowers and bracts points to a much nearer relation to *C. Mangga.*

This species is called by the natives either „*koneng bodas*" sund. = „*temu putih*" mal. (name also given to *C. Zedoaria*) or, „*badur*" jav., the latter name being not certain but most frequently given to this species.



Curcuma Mangga Val. et v. Zijp var. *sylvestris*.

Bulletin du Jardin Botanique de Buitenzorg.

Deuxième Série.

No. I. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 3.

„ II. Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. IV. Dr. E. Rosenstock. Hymenophyllaceae Malayanae.

„ III. W. und J. Docters van Leeuwen—Reynvaan. Einige Gallen aus Java. Sechster Beitrag.
Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels. V.
Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. V.

„ IV. Dr. A. Rant. Ueber die Djamoer-Oepas-Krankheit und über das Corticium javanicum Zimm.

„ V. Dr. W. Staub. Weitere Untersuchungen über die im fermentierenden Thee sich vorfindenden Mikroorganismen.

„ VI. P. A. Ouwens. On a large Varanus-species from the Island of Komodo.
P. A. Ouwens. On a Chlamydosaurus from Dutch South New Guinea.

„ VII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 4.

„ VIII. Dr. J. J. Smith. Die Gruppe der Collabinae. Noch einmal Glomera Bl. Dendrobium Sw. Sect. Cadetia. Bulbophyllum Thou. Sect. Cirrhopetalum. Die Gruppe der Podochilinae. Neue Orchideen des Malaiischen Archipels. VI. Vaccinium malaccense Wight var. celebense J. J. S. Vorläufige Beschreibungen neuer Papuanischer Eriaceae. Einige Ausbesserungen.

„ IX. Dr. J. J. Smith. Die Orchideen von Java. Dritter Nachtrag.

„ X. H. Karny und W. und J. Docters van Leeuwen—Reynvaan. Beiträge zur Kenntniss der Gallen von Java. 5. Ueber die javanischen Thysanoptero-Cecidien und deren Bewohner.

„ XI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 5.

„ XII. C. A. Backer. On some results of the Botanical investigation of Java (1911—1913).

„ XIII. Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels VII.

„ XIV. Dr. J. J. Smith. Die Orchideen von Java. Vierter Nachtrag.

„ XV. W. und J. Docters van Leeuwen-Reynvaan. Einige Gallen aus Java siebenter Beitrag.

„ XVI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 6.

„ XVII. Palmiers du Jardin Botanique de Buitenzorg.

„ XVIII. Dr. A. Rant Ueber die Mopokrankheit junger Cinchonapflanzen und über den javanischen Vermehrungspilz.

„ XIX. Andreas Sprecher. Same und Keimung von Hevea brasiliensis.

„ XX. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 7.

„ XXI. W. und J. Docters van Leeuwen-Reynvaan. Niederländisch Ost-Indische Gallen No. 8. Beschreibungen von Gallen aus Sumatra und Simaloer. No. 9. Beschreibungen von Gallen aus Celebes und aus den Inseln südlich von Celebes.

„ XXII. Dr. A. Rant. Der graue Wurzelpilz von Cinchona.

„ XXIII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 8.

„ XXIV. Capt. C. R. W. K van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 9.

„ XXV. Dr. J. J. Smith. Orchidaceae novae Malayenses VIII.

„ XXVI. Dr J. J. Smith. Die Orchideen von Java. Fünfter Nachtrag.

„ XXVII. Dr. Th. Valeton Sen. New Notes on the Zingiberaceae of Java and the Malayan Archipelago.

1B92

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU
COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

DEUXIÈME SÉRIE.

N°. XXVIII.

SMITHSONIAN INSTITUTION
DEC 7 1928
NATIONAL MUSEUM

CAPT. C. R. W. K. VAN ALDERWERELT
VAN ROSENBURGH.

NEW OR INTERESTING MALAYAN FERNS 10.
TWO CRITICAL FERN GENERA.
TWO NEW FERN GENERA.

0.7922
3 92

BUITENZORG,
IMPRIMERIE DU DEPARTEMENT.
OCTOBRE 1918.

Prijs f 1.—

DEPARTEMENT DE L'AGRICULTURE, DE L'INDUSTRIE ET DU
COMMERCE AUX INDES NEERLANDAISES.

BULLETIN
DU
JARDIN BOTANIQUE
DE
BUITENZORG.

DEUXIÈME SÉRIE.

N°. XXVIII.

CAPT. C. R. W. K. VAN ALDERWERELT
VAN ROSENBURGH.

NEW OR INTERESTING MALAYAN FERNS 10.
TWO CRITICAL FERN GENERA.
TWO NEW FERN GENERA.

BATAVIA,
IMPRIMERIE RUYGROK & Co.
OCTOBRE 1918.

CORRECTIONS.

P. 29. l. 1; For: **Hymenophyllum** *hamuliferum*, v. A. v. R.
Read: **Hymenophyllum hamuliferum**, v. A. v. R.; *H. uncinatum, v. A. v. R.* (not *Sim*), MS.

P. 41, l. 18; For: **Polystichum papyrifolum**, v. A. v. R.
Read: **Polystichum papyrifolium**, v. A. v. R.

P. 61, l. 1. fr. b; For: *A. Hartingtana.*
Read: *A. Hartingiana.*

0, 7922
92

NEW OR INTERESTING MALAYAN FERNS 10.

BY

Capt. C. R. W. K. VAN ALDERWERELT VAN ROSENBURGH.

ISOSPORE FILICALES.

Alsophila reducta, v. A. v. R.

A. dubiae *Bedd.* affinis sed frondes minores, usque ad ± 60 cm. longae, pinnae maximae ± 20 cm. longae, pinnulae maximae ± 4—6 cm. longae et $^3/_4$—1 cm. latae, firmiter coriaceae, margine basin oblique rotundato-truncatam versus subintegerrimae vel leviter sed late crenulatae, apice acuminatae et serrato-crenatae, ceterum lobato-dentatae, venae 1—2 utrinque, sori utrinque 1-seriati, costae approximati.

Distinct in having the stipes longer than the fronds.

Sumatra (Bengkoelen, Lebong Simpang, C. J. Brooks No. 298/S).

Alsophila subulata, v. A. v. R.

A. glabrae *Hk.* similis sed stipitibus basin versus pinnis reductis ± 5 utrinque munitis et pinnulis subulatis, a basi apicem acuminatum versus sensim angustatis.

Sumatra (Bengkoelen, Lebong Simpang, C. J. Brooks No. 300/S).

Alsophila persquamulata, v. A. v. R.

A. squamulatae *Hk.* affinis.—Rachides obscure rufae, subcastaneae, subtus asperulae et decidue ferrugineo-furfuraceae, supra castaneo-tomentosae, indumento squamis fuscis, lineari-subulatis, sat crispatis, filiformi-acuminatis, castaneo-ciliatis copiose intermixto; rachides secundariae similiter tomentosae et squamulosae sed demum sat glabrescentes; pinnulae in costa supra hirsuta et subtus glabra vel parce squamulosa, ceterum glabrae; venae semper simplices.

Java (Mt. Salak, C. A. Backer No. 9274).

Alsophila amaiambitensis, v. A. v. R.; *A. ramispina, Christ* (non *Hk.*), in Ann. Btz., XX, 138, p.p.

Rachides sat atrae, subtus asperulae et decidue ferrugineo-furfuraceae, supra castaneo-tomentosae et plus minusve decidue castaneo-squamulosae. Pinnae petiolulatae, plus minus 45 cm. longae, sensim acuminatae. Pinnulae rigide coriaceae, glabrae, infra pinnam terminalem numerosae; pinnulae terminales acute triangulares, apice serrato-crenatae, basi sensim profunde pinnatifidae; pinnulae laterales e basi late ovata lanceolatae, maximae breviter petiolulatae, ± 8 — 9 cm. longae et 2 cm. latae, apice acuminato crenulato-serrulatae, basin versus sensim profunde pinnatipartitae, basi pinnatae; costa supra hirsuta, subtus decidue squamulosa, squamulis partim ferrugineis, partim castaneis et eroso-ciliatis aut spinuloso-ciliatis. Segmenta lineari-oblonga, conferta, ± 4 mm. lata, apice rotundata, crenata, basi sensim integerrima vel subintegerrima; segmenta inferiora libera, sessilia, basi sat rotundata; costula subtus parce minutissime squamulosa; venae prominentes, glabrae vel subglabrae, usque ad 9 — 10 utrinque, simplices vel furcatae. Sori ad venas inframediales, usque ad 8 utrinque, venas superiores non occupantes.

Hallier's No. 2465 and Molengraaff's No. 3480 are undeterminable because of incomplete material. The former may be A. ramispina *Hk.*

Borneo (Amai-umbit, Hallier No. 3401).

Alsophila Hallieri, v.A.v.R.; *A. Burbidgei, Christ* (non *Bk.*), in Ann. Btz., XX, 138, p.p.

Rachides laeves, subnigrae, supra hirsutae, subtus furfuraceae, indumento fusco vel castaneo, squamulis deciduis, subfiliformibus, fuscis intermixto. Pinnae petiolulatae, plus minus 30 cm. longae et 9 — 12 cm. latae, acuminatae. Pinnulae sat coriaceae, glabrae, patentes vel horizontales, petiolulatae, lineares, maximae ± 5 — 6 cm. longae, 1 — $1^1/_2$ cm. latae, apice breviter acuminatae et serrato-crenatae, margine usque ad ± $^2/_3$ costam versus (ad basin interdum paullo profundius) incisae; costa supra hirsuta, subtus squamulosa, squamulis inferioribus subulatis, nigro-castaneis, brunneo-marginatis et erosis, deciduis, superioribus ovatis, bullatis, fuscis, acuminatis, persistentibus, Lobi oblongi, 2 — 3 mm. lati, obtusi, integerrimi vel apice crenati; venae usque ad 5 — 7 utrinque. Sori costulares, ad venas inferiores positi; capsulae paraphysibus fibrilliformibus, capsulas non superantibus intermixtae.

Hallier's No. 1855 is undeterminable because of incomplete material; it is not A. Burbidgei *Bk.*

Borneo (Mt. Kenepai, Hallier No. 1708).

Alsophila acrostichoides, v. A. v. R.

Stipites ultra 20 cm. longi, gibbis breviter spiniformibus, acutis aculeati, juveniles pilis brevibus, apressis, crispatis, ferrugineis muniti, in sicco castanei, angulosi et sulcati. Frondes lanceolatae, 100 — 120 cm. longae, acuminatae, profunde 3-pinnatipartitae, sub-3-pinnatae, rachide in parte inferiore aculeolata, in sicco castanea, angulosa et sulcata, stipitis more pubescenti. Pinnae lineari-lanceolatae, superiores sessiles, inferiores stipitatae, centrales maximae, usque ad 35 cm. longae et basin versus 15 cm. latae; rachide in sicco castanea, angulosa et sulcata, supra castaneo-velutina, subtus pilis appressis, crispatis, ferrugineis parce munita. Pinnulae papyraceo-coriaceae, supra glabrae, subtus ad costas, costulas et interdum ad venas paleis planis, appressis, brunneis vel pallidis, plus minusve laceratis parce squamulosae, remotae, breviter petiolulatae, ± horizontales, maximae 6—$7^1/_2$ cm. longae, ad vel prope basin $1^1/_2$—2 cm. latae, infra apicem relative longe acuminatum, serrato-crenatum profunde et conferte pinnatifidae, basin versus profunde et remote pinnatipartitae, basi interdum parce pinnatae; costa castanea, rachidum secundariarum more pubescenti. Segmenta lineari-oblonga, usque ad 1 cm. longa, 3 mm. lata, obtusa ad subacuta, rotundato- vel truncato-crenata, sublobulata, infima interdum libera et subpetiolulata; costula castanea; venae usque ad 8—10 in utroque latere costularum, superiores simplices, ceterae 1—2 × furcatae. Sori copiosi, subcostulares ad submediales, adulti Acrostichi more confluentes et paginam inferiorem pinnularum totaliter completentes; capsulae pilis brevibus intermixtis.

Ceram (Kaniki, L. Rutten's Explor. Commiss., Coll. Kornassi No. 541).

Angiopteris Forbesii, v. A. v. R.

Rachides secundariae in sicco brunneae ad castaneae, glabrae (glabrescentes?). Pinnulae coriaceae, in sicco supra fuscescentes, subtus griseo-pruinosae, demum pallide olivaceo-fuscae, maximae breviter petiolulatae (petiolulo usque ad 1 mm. longo), lineari-lanceolatae, 15—$17^1/_2$ cm. longae, medio ± $1^1/_4$ cm. latae, basi obliquae, rotundato-subcordatae ad rotundato-cuneatae, margine subintegerrimae (indistincte lateque crenulatae), apice anguste et longe acuminatae, indistincte serrulatae; costae venaeque subtus squamulis minutis parce brunneo-furfuraceae, ablata pruina costae fuscescentes, venae nigrescentes, subhorizontales, impellucidae; venulae recurrentes longae, nigrescentes vel fuscescentes, impellucidae. Sori submarginales, contigui, in acumen pinnularum longe continui; capsulae ± 10—12, brunneae; indusium distinctum, pilis ferrugineis.

The description is taken from a fragmentary specimen determined by Raciborski as *A. evecta Hoffm. var. pruinosa,* from which it is conspicuously different.

Java (*Bantam,* H. O. Forbes No. 498).

Angiopteris glauca, v. A. v. R., Mal. Ferns & All., Supplem. 1, Corr., 61.

A. pruinosae *Kze* affinis. — Pinnulae chartaceae, in sicco supra olivaceae, subtus virescenti- vel caeruleo-pruinosae, demum pallide olivaceae, maximae lineari-sublanceolatae, breviter petiolulatae, ± 12 — 13 cm. longae, ± $1^1/_2$ cm. latae, basi subaequaliter truncato-cuneatae ad oblique rotundato-cuneatae, margine crenulatae, apice subabrupte acuminatae serrulataeque; costae subtus parce brunneo-furfuraceo-squamulosae; venae leviter obliquae, ablata pruina subtus nigrescentes, impellucidae; venulae recurrentes graciles,

impellucidae, partim pellucidae. Sori a margine remoti; capsulae 6—8, obscure brunneae.

A. pruinosa *Kze* differs in having the largest pinnulae with the base distinctly rotundate-cordate, the sori submarginal, the capsules more numerous, mostly 9 — 10.

Java (Mt. Gede, A. Swartz No. 2637).

Angiopteris leytensis, v.A.v.R.

A. pruinosae *Kze* affinis sed pinnulis maximis vel inferioribus basi truncato-rotundatis vel rotundato-cuneatis, indusio sororum deficiente vel obsoletissimo, capsulis ± 4 — 8.

A. pruinosa *Kze* differs in having the largest or lower pinnulae unequally or subequally cordate at the base, the indusium very distinct, consisting of ferrugineous hairs or fibres, the capsules ± 8 — 16, mostly 9 — 10.

Forma typica: Pinnulae distinctly crenulate, often subabruptly acuminate; sori contiguous. — *Leyte* (*Palo,* A. D. E. Elmer No. 7064; received as A. longifolia *H. & G.*).

Forma negrosensis: Pinnulae partly entire, partly irregularly repando-crenulate or -serrulate, often very gradually acuminate; sori often somewhat spaced. — *Negros (Dumaguete,* A.D.E. Elmer No. 10275; received as A. pruinosa *Kze*).

Angiopteris ceracea, v. A. v. R.

A. pruinosae *Kze* affinis sed pinnulis majoribus, maximis minime 15—25 cm. longis, 2—3 cm. latis, subtus saepe viridulo-(raro caerulescenti- vel purpurascenti-)pruinosis; soris a margine remotis.

A. pruinosa *Kze* has the pinnulae much smaller, the sori nearer the margin.

A. large fern with the fronds 4—6 m high including the stipe. Malay name „pakoe gadjah" (= elephant fern).

Sumatra (Mt. Talamau, H. A. B. Bünnemeijer No. 645).

Angiopteris javanica, Pr., Tent. Pterid., Supplem., 20; *A. Dregeana, de Vr.*, Mon. Maratt., 17, tab. III — IV, fig. 8; *A. Brownii, v.A.v.R.*, MS.; *A. cordata, v.A.v.R.*, MS.

Forma typica: Leaflets $12^1/_2$ — $17^1/_2$ cm. long, $1^1/_4$ — $1^3/_4$ (rarely to 2) cm. broad, the apex mostly subabruptly acuminate, serrulate, the base generally subobliquely truncate- to rotundate-cordate with no deep sinus; sori consisting of 6—10 (mostly 8—9) capsules. A. — Hartingeana *de Vr.* is probably but a form of this, with a more rotundate-cuneate base and more copious capsules. — *Java, Sumatra, Philippines.*

Forma Brownii: Like the type but the leaflets with the base conspicuously cordate, the acumen repando-crenulate, and the sori reaching nearly

the apex of the acumen, consisting of 15 — 20 capsules. — *Sumatra* (*Lebong Donok*, C. J. Brooks No. 307/S; cultivated in Mr. Brown's garden)

Forma cordata: Like the type but the leaflets to 20 — 22$^1/_2$ cm. long, very gradually long-acuminate, the base very cordate with a deep sinus. — *Java (Mt. Slamet,* C. A. Backer No. 367).

Angiopteris elliptica, v. A. v. R.

Rachides glabrae, in sicco nigro-castaneae. Pinnulae valde coriaceae, elongato-ellipticae, mediales vel supramediales ± 15—17$^1/_2$ cm. longae, 3—4 cm. latae, integerrimae, apice acuminatae serrataeque, basi inaequaliter vel oblique rotundatae ad subtruncato-cunetae; costa nigro-castanea, subtus basin versus parce squamulosa; venae subhorizontales, demum obscure fuscae vel nigrescentes, pellucidae vel impellucidae; venulae recurrentes absconditae, non longae, impellucidae, contra lucem spectantes solum sat perspicuae. Sori intramarginales; capsulae usque ad 18—22, latere ventrali brunneae, dorsali nigro-castaneae.

Sumatra (Bengkoelen, Lebong Simpang, C. J. Brooks No. 306/S).

Angiopteris grisea, v. A. v. R.

Rachides, in sicco subtus stramineae vel pallide flavido-fuscae, supra 3-sulcatae et olivaceae. Pinnae plus minus 70 cm. longae. Pinnulae tenuiter herbaceae, brevissime petiolulatae, in sicco flaccidae et olivaceo-virides, subtus quam supra pallidiores et in vivo caeruleo-griseae, glabrae vel praesertim ad costam parce et pallide fusco-lanuginoso-squamulosae; pinnulae centrales maximae, in specimine lineari-sublanceolatae, ± 9 — 10 cm. longae, parte inferiore ± 1$^1/_2$ —1$^3/_4$ cm. latae, basi plerumque subaequaliter et late rotundato-cuneate, margine regulariter vel irregulariter serrulato-crenulatae, parte superiore in acumine relative brevi serrulato angustatae; costa olivacea; venae subobliquae, obscure olivaceae, sat impellucidae; venulae recurrentes graciles, longae, sat pellucidae. Sori intramarginales, contigui, acuminem non attingentes; capsulae ± 4 — 5; indusium distinctum, pilis ferrugineis.

Java (*Moeriah,* W. Docters van Leeuwen No. 700).

Angiopteris olivacea, v. A. v. R., Mal. Ferns & All., Supplem. I, Corr, 60.

Pinnulae sessiles vel breviter petiolulatae, tenuiter chartaceae, in sicco supra obscure, infra pallide olivaceo-virides, crenulatae vel serrulato-crenulatae, basi oblique subtruncato-cordatae, apice abrupte acuminatae et serratae; pinnae maximae usque ad 12 cm. longae, 1$^3/_4$ — 2$^1/_4$ cm. latae; costa venaeque subtus obscure olivaceae ad nigro-fuscae, decidue, parce et minute squamulosae; venae impellucidae; venulae recurrentes gracillimae, impellucidae. Sori contigui, a margine remoti; capsulae 5—10.

Java (*Mt. Wilis,* J. A. Lörzing No. 936).

Angiopteris Versteegii, v. A. v. R.; *A. angustifolia, Christ* (non *Pr.*), p.p., in Nov. Guin., VIII, Bot., 162.

A. Lorentzii *Rst.* affinis sed pinnulis $^1/_4$ longioribus, subintegerrimis (i.e. late et obsolete crenulatis), venulis recurrentibus adsunt sed non valde distinctis, $^1/_4$—$^3/_4$ longitudinis venarum metientibus, capsulis sororum ± 8 — 10.

New Guinea.

Angiopteris inconstans, v. A. v R.

Frondes usque ad 4 m. vel plus longae. Pinnae plus minusve 80 cm. longae, rachide subtus tereti, brunneo-paleata, glabrescenti, punctulis obscure brunneis parce munita, supra 2 — 3-sulcata. Pinnulae breviter petiolulatae, tenuiter chartaceae, flexiles, in sicco olivaceae, supramediales maximae, lineares, ± 15—16 cm. longae, ± 1$^3/_4$ cm. latae, apice sensim vel subabrupte acuminatae, serratae, margine integerrimae vel subintegerrimae (indistincte crenulatae), non raro irregulariter recurvato-undulatae et specie repandulae, basi pinnularum inferiorum oblique truncato-cordata, pinnularum superiorum oblique et late rotundato-cuneata; costae venaeque in sicco pallidae vel obscure olivaceae, subtus parce brunneo-paleatae, glabrescentes; venae horizontales vel subhorizontales, demum ± pellucidae; venulae recurrentes partim deficientes, partim breves indistinctaeque, impellucidae. Sori conspicue intramarginales, acumen pinnularum attingentes; capsulae usque ad 16 — 26, brunneae.

A. amboinensis *de Vr.* is unknown to me but, by the diagnosis, different from this.

Amboina (Hoekoerila, L. Rutten's Explor. Commiss., Coll. Kornassi No. 1143).

Angiopteris Rutteni, v. A. v. R.

Frondes usque ad ± 5 m. longae, rachidibus in sicco olivaceis vel fuscis, glabris (glabrescentibus?). Pinnae usque ad 75 cm. longae vel longiores, rachide in sicco subtus tereti, supra 2 — 3-sulcata. Pinnulae sat herbaceae, flaccidae, subsessiles vel brevissime petiolulatae (petiolulo usque ad ± 1 mm. longo), in sicco plus minusve pallide olivaceo-fuscescentes; pinnae centrales maximae, lineares, ± 15 — 17$^1/_2$ cm. longae, 1$^1/_2$ — 2 cm. latae, steriles quam fertiles paullo latiores, basi plus minusve oblique rotundato-truncatae, margine crenulatae, apice sensim vel subabrupte acuminatae, late crenulato-serrulatae; costa venaeque pallidae ad nigro-fuscescentes; costa subtus parce brunneo-squamulosa; venae horizontales vel subhorizontales, impellucidae; venulae recurrentes nullae. Sori marginem approximati, contigui vel subremoti, acuminem non attingentes; capsulae brunneae, ± 10 — 16; indusium indistinctum, specie nullum.

Ceram (Kaloa, L. Rutten No. 177).

Aspidium rarum, v.A.v.R.

Sagenia. — Stipites aggregati, $7^1/_2$ — 15 cm. longi, in sicco rufi vel castanei, angulosi, supra sulcati, basin versus squamosi, ceterum cum costa minutissime decidueque fibrilloso-puberuli; squamae anguste subulatae, minute denticulatae vel ciliolatae, ut pili rufae vel castaneae. Frondes herbaceae, glabrae, lineari-lanceolatae, $12^1/_2$ — $17^1/_2$ cm. longae, $2^1/_2$ — 3 cm. latae, apicem acuminatum et basin subabrupte decurrentem versus sensim angustatae, margine oblique sinuatae, anguste recurvatae; venae primariae ascendentes, marginem fere attingentes; areolae numerosae; venulae liberae adsunt. Sori irregulariter sparsi sed plerique in 2 liniis irregularibus, venas primarias approximatis, seriati; indusium persistens, rufum vel castaneum. — Planta rara.

Banca (Mt. Pading, H.A.B. Bünnemeijer No. 2258).

Aspidium falcipinnum, v. A. v. R.

Sagenia.— Stipites castanei, basi solum squamis paucis, lineari-subulatis, fuscis muniti. Frondes ovatae, 40—50 cm. longae et ± 25 cm. latae, firmae, flaccidae, glabrae, 3 — 7-foliolatae; pinnae terminales subhastato-3-fidae, segmento centrali ovato, segmentis lateralibus lanceolato-ovatis, elongatis, subfalcatis, acuminatis, ascendentibus, basi exteriore leviter cordata; pinnae laterales 1 — 3 utrinque, ascendentes, ovato-lanceolatae, elongatae, subfalcatae, acuminatae, petiolulatae, usque ad 20 cm. longae, basi inaequaliter rotundatae, latere posteriore latiore; pinnae laterales singulares vel basales basi antica furcatae; margines integerrimi vel subsinuati; costae subtus prominentes, castaneae; venae primariae graciles sed distinctes, saepe incurvatae; areolae numerosae, venulas liberas includentes. Sori abundantes, irregulares, parvi; indusium parvum, saepe elongatum, persistens.

Sumatra (*Bengkoelen, Lebong Tandai,* C. J. Brooks No. 374/S).

Aspidium evenulosum, v. A. v. R.

Sagenia. — Rhizoma breve, erectum, squamis lineari-subulatis, fuscis, integerrimis munitum. Stipites aggregati, 15 — 25 cm. longi, basin versus decidue squamosi, cum rachide petiolulisque castanei, nitentes, supra fibrillis brevibus, brunneis tomentosi. Frondes deltoideae, 10—20 cm. longae, 5—15 cm. latae, 2-pinnatifidae, acuminatae, uniformes vel fertiles segmentis paullo contractis. Pinnae flaccido-coriaceae, glabrae, fibrillis brevibus, brunneis ciliolatae, infra pinnam terminalem 1—2 utrinque; pinnae terminales deltoideae, usque ad 15 cm. longae et 10 cm. latae, acuminatae, parte inferiore profunde pinnatifidae, ceterum acuminem integerrimum versus sensim subsinuato-lobatae, segmentis infimis paullo obliquis, lineari-lanceolatis, usque ad 2 cm. latis, subsinuato-lobatis; pinnae laterales paullo obliquae, subfalcatae; infimae (vel solitariae) petiolulatae, subsemiovatae, usque ad 5 cm. latae, subacute acuminatae, semifacie superiore profunde lobatae, semifacie inferiore productae, pinnatifidae, segmento infimo maximo, plus minusve lobato; supremae (si adsunt) lineari-lanceolatae, brevius petiolulatae vel subsessiles, semifacie inferiore non vel paullo productae; costae costulaeque supra ± breviter fibrilloso-tomentosae. Lobi obliqui, obtusi vel maximi non raro subacuti; areolae leviter absconditae; venulae inclusae frondium sterilium nullae, frondium fertilium paucae. Sori sat magni, remoti, seriati, inter marginem costulamque mediales, partim ad venas anastomosantes, partim ad venulas inclusas positi; indusium persistens, rotundato-reniforme, sinu angusto, supra breviter et decidue fibrillosulum, atro-fuscum et coriaceum, margine relative lato, membranaceo, pallidiore.

Ceram (*Batoe Asa*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 835).

Aspidium nebulosum (Bk.), C. Chr., Ind. Fil., 84; v. A. v. R., Mal. Ferns, 246; *Nephrodium nebulosum, Bk.*, in Journ. of Bot., XVIII, 213.

Terminal pinna 3-fid to pinnatifid, the basal lobes deltoid to lanceolate.

Var. gigas (v.A.v.R., Supplem. I, 5): Fronds to 65 cm. long. — Also in *Banca* (*Goenoeng Pading/Bentja*, H. A. B. Bünnemeijer No. 2242).

Asplenium longum, v.A.v.R.

Thamnopteris. — Rhizoma breve, erectum, crassum, demum glabrescens et opaco-asperulum; squamae lineares, olivaceo-brunneae, nitentes (specie iridescentes), margine in lacinias longitudinales, longe setiformes, subrectas, integerrimas irregulariter dissectae. Stipites approximati, pluriseriati, crassi, ± 5 cm. longi, basi decidue squamosi, basibus persistentibus squamarum demum asperuli. Frondes coriaceae, glabrae, lineari-oblanceolatae, 70 — 80 cm. longae, in parte superiore 10 — 15 cm. latae, integerrimae, basin decurrentem versus sensim angustatae, margine paullo incrassatae (subcartilagineae) et anguste recurvatae; costa utrinque leviter prominens; venae ascendentes, leviter prominentes, simplices vel furcatae. Sori in parte superiore latiore frondium, $^1/_3$ — $^1/_2$ partem inferiorem venarum venularumque occupantes, raro venulis sterilibus separati, costam non attingentes; indusium pallidum.

The fronds examined are not nest-forming; they have the apex somewhat damaged, so that it is impossible to make out positively whether the normally developed fronds are obtuse or acute. — Veins crowded, to ± 1 mm. apart.

Banca (*Mt. Mangkol*, H. A. B. Bünnemeijer No. 2131).

Asplenium perlongum, v.A.v.R.

Thamnopteris.—A. longo *v.A.v.R.* affine sed differt squamis ferrugineis, crispatis, in lacinias crispatas, subflexuosas, subdenticulatas fimbriatis, stipitibus brevioribus ad longioribus, frondibus longioribus, usque ad 145 cm. longis, tenuioribus, basi in stipitem minus sensim (subabrupte) decurrentibus, apice acutis, breviter acuminatis, costa supra magis prominens, obtuse lateque tetragona et lateraliter canaliculata, venis minus prominentibus, soris costam attingentibus vel subattingentibus.

Banca (*Mt. Maras,* H. A. B. Bünnemeijer No. 1846).

Asplenium carinatum, v. A. v. R.

Thamnopteris. — Rhizoma breve, crassum, fusco-squamosum. Stipites aggregati, breves, vix conspicui. Frondes relative tenues, flaccidae, glabrae, lineari-oblanceolatae, 40 — 50 cm. longae, ± 5 cm. latae, breviter subabrupte acuminatae, integerrimae, basin versus sensim angustatae, margine leviter incrassatae recurvataeque; costa supra anguste carinata, subtus plana (vel in sicco sulcata); venae graciles, patentissimae sed non horizontales, saepe furcatae. Sori in dimidia parte superiore frondium, dimidiam partem inferiorem venarum occupantes, costam attingentes, venis et venulis posticis venarum ramosarum sterilibus separati; indusium obscure brunneum.

Originally determined as A. phyllitidis *Don*, which differs in having the fronds distinctly stalked, the costa prominent on both sides, at least not flattened beneath, and the sori much longer, separated by a relatively narrow sterile space from the margin, not reaching the costa.

Celebes (*Maros,* Teysmann No. 12791).

Asplenium nidus, L., Spec., II, 1079; v. A. v. R., Mal Ferns, 439. Supplem., 282.

It is often difficult to make out whether a plant determined as A. nidus *L.* is a true „nidus" or a related species, since in most herbarium specimens the rhizome and stipes are totally wanting, the fronds being often cut off far above the base. The few specimens of the Buitenzorg Herbarium, which have still a portion of the rhizome and are labelled A. nidus *L.*, have the rhizome very short, thick, with the fronds sessile or subsessile, crowded, varying from linear-lanceolate to oblanceolate, cuneate or decurrent at the base, narrow to very broad, naked or sparingly and very minutely eroso-squamulose beneath; the scales of the rhizome are fuscous to nigrescent, with the margin fimbriated into long, setiform or filiform and more or less crisped or flexuous laciniae. In typical „nidus" the costa is prominent and blunt on the under side but our specimens have the costa prominent on one side (*either* above *or* beneath) or on both sides, rounded, quadrangular, keeled or keel-shaped. The sori, varying from very short to very long, are confined to the upper part ($^1/_3$ — $^1/_2$) of the fronds and placed on all the simple veins and the veinlets of the branched veins, rarely separated by sterile posterior veinlets. The living plants have the fronds forming a humus-collecting crown- or funnel-shaped nest. — It is very well possible that several of those forms may be separated as distinct species from typical A. nidus but, although our

material is abundant in forms, the number of each specimen is insufficient or incomplete.

A. australasicum *Hk.*, united by Baker and Christensen with A. nidus *L.*, is perhaps distinct. According to Hooker's diagnosis and plate the fronds are somewhat panduriform, narrowed gradually from a very broad upper part towards the base and then somewhat dilated again, not narrow or decurrent.

A. nidiforme *v. A. v. R.* has the fronds cuneate-spathulate, decurrent at the base, provided beneath wit small deciduous squamules which are long-filiform or stellate-fimbriate into long-filiform laciniae.

A. simplex *Mett.* (not *Bl.*), referred by Hooker to A. phyllitidis *Don* and by Christensen to A. nidus *L.*, is unknown to me; the Buitenzorg material referrible to it has the rhizome and fronds of A. nidus and the sori of A. phyllitidis, though shorter.

A. phyllitidis *Don*, united by Christensen and others with A. nidus *L.*, should be separated from the same as being undoubtedly distinct. As far as one of our Philippine specimens shows, the fronds are tufted, not nest-forming; all our specimens have the fronds distinctly stalked (stalks to 4 cm. long), cuneate or decurrent at the base and provided with long sori only separated from the margin by a rather narrow sterile space, separated from each other by the sterile posterior veinlets of the branched veins.

A. pachyphyllum *Kze* is unknown to me. The Buitenzorg material referrible to it is very like A. phyllitidis *Don*; it differs in having the sori much shorter.

Asplenium belloides, v. A. v. R.; *A. subspathulatum, v. A. v. R.* (not *Rst.*), Bull., Btz., *1915*, XX, 7.

Asplenium paradoxum, Bl., Enum. Pl. Jav., II, 179; v.A.v.R., Mal. Ferns, 465.

A specimen cultivated in the Buitenzorg Gardens has some of the sori partly scolopendrioid, partly diplazioid.

Asplenium subavenium, Hk., Spec. Fil., III, 143, tab. CLXXXI *B*; Bedd., Ferns Br. I., II, tab. CCLXXXVIII; v.A.v.R., Mal. Ferns, 453.

Bunnemeijer's No. 2240 from *Banca* (*Bentja, Toboali*) differs from Hooker's and Beddome's diagnoses and plates in having the pinnae subentire or slightly crenulate, and narrowly rotundate-cuneate at the lower base.

Asplenium lepturus, J. Sm., in Journ. of Bot., III, 408; v.A.v.R., Mal. Ferns & All., Supplem. I, 292.

Also in *Ceram* (*Meseleïnanpas,* L. Rutten No. 371).

Campylogramma lancifolia, v. A. v. R., Bull. Btz., *1916*, XXIII, 7, tab. I; Mal. Ferns & All., Supplem. I, 334.

Since the plants cultivated in the Buitenzorg Gardens, on which the description of this species is based, have become older, it proves that the stipes are articulated to the rhizome, a fact not to be seen in young plants even when dried. It is therefore rather evident that the genus Campylogramma (as far as regards this species, the rhizome and base of the stipes of C. pteridiformis *v. A. v. R.* being still unknown) is related to the genus Pleopeltis § Pleuridium and this species to Pl. Zollingeriana *v. A. v. R.* (= *Polypodium heterocarpum Bl.*, Flor. Jav , II, 167, tab. LXXV).

I am unable to examine which of both species may probably have been the ancestor or descendant of the other or that they are both descendants of a common ancestor. While the knowledge of the often easily recognizable affinity between genera and species is very valuable for their systematical grouping, I think the tracking of their probable or apodictically pretended descent, which depends as a rule only on not to be proved suppositions or personal conceptions, is too trifling and the mention of it too worthless to take it into consideration for systematic-botanical publications.

Cyathea crenulata, Bl., Enum. Pl. Jav., II, 244; v. A. v. R., Mal. Ferns 21; Supplem., 27, 488, and Corr.

Forma latissima: Like forma squamulosa (includ. *forma asperula*) but the largest pinnulae 2—3$^1/_2$ cm. broad at the base; at least the lower tertiary segments conspicuously remote. — *Java* (*Mt. Kawi*, Arens).

Cyathea tuberculata, v. A. v. R.

Stipites in sicco sursum cum rachidibus rufo-fusci, deorsum atro-castanei, ubique squamosi, squamis longis, lanceolato-subulatis, ferrugineo-fuscis, graciliter eroso-laceratis, basibus persistentibus, inferioribus tuberculiformibus, superioribus punctiformibus. Frondes profunde 3-pinnatipartitae; rachides supra castaneo-hirsuto-tomentosae, subtus decidue ferrugineo-crispato-pilosae, indumento squamis copiose intermixto; squamae squamis stipitis similes sed superiores sensim minores, sat integerrimae, basi persistente, punctiformi. Pinnae petiolatae, lineari-oblongae, ± 25 — 35 cm. longae et 10 cm. latae, abrupte acuminatae. Pinnulae subcoriaceae, glabrae, confertae, sessiles, subhorizontales, lineares, maximae ± 5 — 5$^1/_2$ cm. longae et 1 — 1$^1/_4$ cm. latae, basi rotundato-truncatae, margine fere ad costam incisae, apice obtuso angustatae vel breviter acuminatae; pinnae inferiores paullo abbreviatae; costae supra basin versus hirsutae, subtus squamulis ovatis, bullatis, ferrugineis, acuminatis copiose munitae. Lobi subconferti, subhorizontales, lineari-oblongi, subfalcati, 2 — 2$^1/_2$ mm. lati, obtusi, integerrimi; costulae subtus basin versus bullato-squamulosi; venae usque ad 8 — 10 utrinque, furcatae, superiores simplices.

Sori pauci, ad venas inferiores costulares; indusium tenue, demum irregulariter cupuliforme.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 297/S).

Cyathea moluccana, R. Br., Desv., Prod., 322; v.A.v.R., Mal Ferns, 15; *C. Brunonis,* Wall., List, no. 179.

The specimens of the Buitenzorg Herbarium, gathered in *Borneo, Lingga* and *Sumatra* and one in an unknown locality, have the rachis naked and smooth or more generally hirsute with deciduous hairs leaving the rachis punctulate-asperulous on the upper side, the pinnae straight or falcate, articulate to the rachis, papyraceous to subcoriaceous, entire, crenulate or even slightly lobed, acuminate or caudate with the acumen serrulate-crenulate to serrate, the main veins branched with 2—5 veins on a side, accompanied by 0—2 simple or forked intermedial veins proceeding from the costa in the direction of the margin, between the main ones, the veins occasionally anastomosing amongst themselves between the sori and the margin, the sori large, sometimes small, irregularly arranged in 1 row or in 2—3 rows on each side of the costa, approximate to it or not, the indusia with a persistent base, sometimes deciduous. — I am unable to separate these forms because of incomplete material. I do not consider them as distinct species and I am inclined to consider as mere local derivatives the closely allied species described by Copeland.

Some of those species are apparently exindusiate and Copeland says „Whoever is disposed to rename some of these species in Alsophila should have difficulty in overlooking the fact that they are nearly related to *Cyathea Brunonis* . . . . etc."

I have recently received from H. I. H. Prince Roland Bonaparte for identification a fragment of a plant from *Serawak* (*Kuching,* Coll. No. 184, April 1914). Judging from the diagnosis of C. fuscopaleata *Copel.*, the habitat and collecting date of the quoted fragment, it belongs *no doubt* to C. fuscopaleata *Copel.* — That species is described as having exindusiate sori, — which may depend on how it is examined.

When we look on the sori of the fragment quoted *from above* only, they really seem to be exindusiate, even when the capsules are removed. By a more exact examination *from the side*, however, by at least 25 times magnifying power, we see that the receptacles are borne on truncate, subconical elevations corresponding with distinct impressions on the upper surface of the pinnae. These elevations are surrounded at the apex, immediately under the receptacle, by a very narrow brown line which can easily be removed in fragments with a fine needle without damaging the epidermis of the elevations. This line or ring evidently belongs *not* to the epidermis of the elevation, though it is more or less adpressed to the same;

it is attached with the inner side to the base of the receptacle and for the rest it is free; evidently it is the very rudimentary, apparently wanting indusium, and I believe it is not too bold to suppose that the other related „exindusiate" species have a similar ring-shaped line or rudimentary indusium.

As to the question of renaming those species in Alsophila, I observe that in Cyathea several species have a truly globose indusium deciduous in the upper part but with a persistent, saucer- or ring-shaped base encircling the receptacle. Such species are at full maturity not distinguishable from Alsophila since in Alsophila we have species with a ring-shaped spurious indusium. Therefore I think it would be better not to refer to Alsophila the species of Cyathea that have a rudimentary indusium but to Cyathea those species of Alsophila that have a cup-, saucer-, ring- or whorl-shaped spurious indusium and to maintain in Alsophila only the really exindusiate species.

In doing so the difficulty suggested by Copeland is dissolved and we get for Cyathea the following, partly known, partly new, combinations:

Cyathea contaminans (Wall.), Copel, in Philipp. Journ., IV^c, 60; *Alsophila glauca, J. Sm.* (includ. varieties), v. A. v. R., Mal. Ferns & All., Supplem. I, 68; *Polypodium contaminans,* Wall., List, No. 320.

Var. persquamulifera : Costae supra hirsutae, subtus copiose squamuliferae et longe pilosae; squamae inferiores partim longae, subulatae, brunneae, pilis breviter spinuliformibus, castaneis remote ciliatae, partim parvae, subbullatae, pallide ferrugineae vel ochraceae, longe fimbriato-ciliatae; sequentes sensim in pilos longos, pallidos, articulatos transientes; pili squamulis paucis, ovatis, bullatis, ochraceis, apice fimbriato-acuminatis intermixti; costulae supra glabrae, subtus copiose longe pilosae et parce bullato-squamulosae; sori $^1/_4$ — $^3/_4$ partem segmentorum occupantes. — *Sumatra* (*Mt. Talamau,* H. A. B. Bunnemeijer No. 961).

Cyathea saparuensis, v.A.v.R.; *Alsophila saparuensis, v. A. v. R.*, Mal. Ferns, 38.

Cyathea alpina, v.A.v.R. (not *Roth); Alsophila alpina, v.A.v.R.*, Mal. Ferns, Suppl. I, 62.

Cyathea indrapurae, v.A.v.R.; *Alsophila indrapurae, v. A. v. R.*, l.c., 63.

Cyathea punctulata, v.A.v.R.; *Alsophila punctulata, v.A.v.R.*, l.c., 64.

Cyathea brevifoliolata, v.A.v.R.; *Alsophila brevifoliolata, v. A. v. R.*, l.c., 64.

Cyathea palembanica, v.A.v.R.; *Alsophila palembanica, v.A.v.R.*, l.c., 493.

Cyathea okiana, v.A.v.R.; *Alsophila okiana, v. A. v. R.*, l.c., 494.

Cyathea benculensis, v. A. v. R.; *Alsophila benculensis, v. A. v. R.*, l.c., 493.

Cyathea truncata (Brack.), Copel., in Philipp. Journ., IV^c, 39; *Alsophila truncata, Brack.*, Expl. Exp., XXI, 289, tab. XLI; v.A.v.R., Mal. Ferns, 42.

Copeland says „sori . . . exindusiate" but Christ states „indusio angusto orbiculari plano . . .", and our only specimen from *Samoa* (*Tutuila*, Reinecke No. 171) has a flat, scariose, eroso-fimbriate, ring-shaped indusium encircling the receptacle.

Cyathea straminea (Gepp), v.A.v.R.; *Alsophila straminea, Gepp*, in Gibbs, Contr., 192.

Capsules intermixed with pale, slightly crisped hairs; indusium rudimentary, consisting of a minute, brown, round squamule encircling the receptacle.

Cyathea pumilio, v.A.v.R.

Herba! Stipites usque ad ± 20 cm. longi, in sicco rufi vel castanei, copiose sulcati, parce muricati, copiose punctulati, cum rachidibus supra hirsuto-villosi, subtus tomentoso-villosi, pilis longis, squamis numerosis intermixtis; pili antici recti, rufi vel castanei, postici ± crispati, pallide ochracei; squamae lineari-lanceolatae vel subulatae, pallide ochraceae, juveniles pilis longis, caducis, rufis vel castaneis apiculatae et ciliatae, demum leviter erosae vel laceratae. Frondes elongato-lanceolatae, ± 70—75 cm. longae, 3-pinnatifidae, abrupte acuminatae. Pinnae remotae, ascendentes, sessiles, inferiores sensim minores, deflexae, lineari-lanceolatae, basi angustatae; pinnae mediales vel inframediales maximae, deltoideo-lanceolatae, usque ad ± $22^1/_2$ cm. longae, basi usque ad 6 cm. latae, apice sensim acuminatae. Pinnulae firmae sed non coriaceae, glabrae, supra in sicco nigrescentes, infra olivaceae, paullo remotae, sessiles, subhorizontales, elongato-oblongae, usque ad 3 cm. longae, basi subtruncata ± $1^1/_4$ cm. latae, infra apicem obtusum et subintegerrimum vel crenulatum profunde pinnatifidae; costae, rachidum more, subvillosae, pilis posticis squamulis intermixtis; squamulae inferiores cum squamulis rachidum similes sed minores, superiores ovatae, bullatae, longe acuminatae. Segmenta subremota, patentia, lineari-oblonga, usque ad 6 mm. longa, ± 2 mm. lata, obtusa, margine recurvata et subintegerrima vel crenulata; costulae supra parce pilosae; venae usque ad 4 — 5 utrinque, simplices vel furcatae, subtus nigrescentes. Sori sat costulares, usque ad 3 — 4 utrinque, venas superiores non occupantes, adulti confluentes; capsulae pilis brevibus intermixtae; indusium juvenile cupuliforme, adultum planum, orbiculare, integerrimum, fuscum, persistens, receptaculum cinctum.

According to the field note a herb, i.e. non-arborescent.

Ceram (Meseleïnanpas, L. Rutten Nos. 372, 373).

Cyathea nigrospinulosa, v.A.v.R.

Frondes lanceolatae, ± 200 cm. longae, utrinque angustatae, acuminatae, 3-pinnatifidae; rachis primaria pallide fusca, opaca, supra decidue squamulosa, ceterum decidue furfuracea; squamulae fuscae, crassae, subintegerrimae, inferiores lineari-subulatae, superiores lineari-filiformes, crispatulae; furfur pallide fuscus, gibbis minutissimis, acute conicis, nigris, numerosis sparse intermixtus. Pinnae breviter petiolulatae, usque ad 50 cm. longae, acuminatae, inferiores sensim reductae; rachides secundariae supra castaneo-hirsutae, ceterum decidue filiformi-squamulosae, furfuraceae, squamulis crassis, fuscis, ± integerrimis; furfur punctis elevatis, brunneis vel nigris, parce intermixtus. Pinnulae remotae, coriaceae, glabrae, sessiles, subhorizontales, subulato-lanceolatae, maximae ± 11 cm. longae, basi ± $2^1/_2$ cm. latae, profunde pinnatifidae, apice acuminatae, serrato-crenatae; costa supra hirsuta, subtus minute squamulosa; squamulae pallide fuscae, partim deciduae, lacerato-fimbriatae vel -ciliatae, inferiores furfuriformes, superiores bullatae. Lobi conferti vel approximati, subhorizontates, oblongi, usque ad $1^1/_4$ cm. longi et $^1/_2$ cm. lati, obtusi, late crenulati vel apicem versus serrulato-crenulati; costula subtus parce bullato-squamulosa; venae obliquae, usque ad ± 8 utrinque, saepe furcatae, infimae posticae a costa ortae. Sori utrinque ad venas 2 — 5 inferiores mediales; indusium scariosum, irregulariter rumpens; basi persistenti, cupuliformi vel scutelliformi, saepe inciso-lobata; capsulae paraphysibus castaneis, articulatis intermixtae.

This seems at first sight to be the Amboinese representative of C. integra *J. Sm.*, wanting in our Herbarium. It does, however, not agree with specimens of that species received from the Philippines, which differ in having the stipe provided (and the furfur of the rachises intermixed) with deciduous, rather thin, pale (nearly white), brown-spinulose-ciliolate squamules not mentioned in Copeland's description (Philipp. Journ., IV^c, 35).

Amboina (*Wai Joeä*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 1162).

Cyclopeltis Presliana (J. Sm.), Berk., Introd., 517; v.A.v.R., Mal. Ferns, 164; *Lastrea Presliana*, *J. Sm.*, in Journ. of Bot., III, 412.

According to the present conception this species *seems* to be very variable. The specimens, however, occurring in the Buitenzorg Herbarium and labelled C. Presliana *Berk.*, show so many striking differences, which are still more conspicuous in living plants, that a dissolution into more species should be sufficiently justified. A separation, however, must be put off till more material of all „forms" and a complete, correct description of the type species are available. — At any rate it is to be considered as *not* identical with C. semicordata *J. Sm.*

Cyclopeltis latupana, v.A.v.R., in Bull. Btz., *1914*, XIV, 5; Mal. Ferns & All., Supplem. I, 138.

It *may* be possible that this species is identical with C. semicordata *J. Sm.* but I think it not probable since the latter seems to be exclusively American. Beddome's plate XXXV of *Polystichum semicordatum* (*Moore?)* in Ferns Br, I., I, agrees much more with C. latupana than with Mettenius' description of *Aspidium semicordatum Sw.* in Farng., IV, Phegopt. & Aspid., 36, Diels' fig. 96*a* in Engl. & Prantl, Nat. Pfl.fam., 1^4 and Christ's fig. 735 in Farnkr. d. Erde.

Cyclophorus Beddomeanus (Gies.), C. Chr., Ind. Fil., 198 (not v.A.v.R., Mal. Ferns, 695); *Niphobolus Beddomeanus, Gies.*, Niph., 101.

This species does not occur in *Malaya*, except when Copeland's determination of *Borneo* plants [Saraw. Mus. Journ., II (III), 410] is correct. The plants cultivated in the Buitenzorg Gardens (introduced from *New Guinea*, most of which were determined by Raciborski and others as *Polypodium stigmosum Sw.*) and those gathered in *Ceram* and *New Guinea*, originally considered by me as C. Beddomeanus, do not agree with the anatomic characters given by Giesenhagen; they resemble very much a specimen of C. splendens *C. Chr.* received from the *Philippines* (*Mindanao*, Elmer No. 13579) and one of them bears on its label the note:

Polyp. (Niph.) Stigmosum Sw. or Splendens Hk.
Characters of both mixed.
Humboldtsbay, Nov. Guinea.

Cyclophorus splendens (J. Sm.), C. Chr., Ind. Fil., 201; v.A.v.R., Mal. Ferns, 696; *Niphobolus splendens, J. Sm.* in Journ. of Bot., III, 396.

Plants from *Ceram* and *New Guinea*, partly occurring in the Buitenzorg Herbarium, partly cultivated in the Buitenzorg Gardens, differ from this species only in having the fronds varying from subsessile to moderately long-stalked with the stipes subdeltoid in transversal section, i.e. flat or more commonly distinctly concave (canaliculate) above and keeled beneath; the young fronds, especially those of the young plants, have the short-branched stellate hairs of the under surface provided with a long, caducous, erected central branch. Some of the fronds have very distinct palisade cells which I now consider as a less valuable characteristic. A much more valuable characteristic is the shape of the epidermal cells of the upper surface, which have the side walls flat or but slightly undulated in C. Beddomeanus and conspicuously undulated in C. splendens and in the *Ceram* and *New Guinea* specimens quoted above.

Cystopteris tenuifolia, v.A.v.R.; C. tenuisecta, *Mett.*, in Ann. Mus. Bot. L. B., I. 241, forma?

Rhizoma probabiliter breve, squamis lanceolato-subulatis, palide fuscis,

acuminatis vestitum. Stipites ± 30 cm. longi, cum rachidibus straminei, scarioso-squamulosi et pilis articulatis fibrillosi; squamulae sparsae, patentes, basibus persistentibus, plano-oblongis, leviter elevatis, stipitem cum rachidibus asperulum efficantes. Frondes triangulari-lanceolatae, ± 50 cm. longae et 30 cm. latae, acuminatae. Pinnae horizontales, subopposítae, subsessiles, inferiores valde remotae, lanceolato-ovatae, usque ad 15 cm. longae et 6 cm. latae, acuminatae, sequentes sensim minores et minus remotae. Pinnulae tenuiter herbaceae, supra glabrae, subtus minutissime fibrilloso-glandulosae, usque ad 18 utrinque, horizontales, approximatae, subsessiles, oblongae, usque ad 3 cm. longae et $1^1/_2$ cm. latae, inferiores pinnarum inferiorum basi pinnatae, apicem obtuse rotundatum versus profunde pinnatifidae; costae, costulae venaeque parce fibrillosae. Segmenta tertiaria inferiora pinnarum inferiorum lineari-oblonga, usque ad 15 mm. longa et 3 mm. lata, obtusa, in lobulis obliquis, subtruncato-rotundatis, integerrimis vel crenatis profunde lobata; segmenta tertiaria superiora basi connata, integerrima vel dentato-crenata; venae in lobulis ultimis solitariae, graciles, simplices vel furcatae. Sori in segmentis tertiariis solitarii, ad venas infimas anticas mediales; indusium rotundatum, subfimbriato-glandulosum, demum reflexum.

Sumatra (*Bengkoelen*, *Lebong Simpang*, C. J Brooks No. 284/S).

Davallia subdissecta, v. A. v. R., Bull. Btz., *1916*, XXIII, 11.

Near D. dissecta *J. Sm.* — Rhizome scales squarrose, narrowly long-linear-subulate from a suddenly dilated, round, peltate, adpressed base, ciliate; soriferous lobules proportionally broader at the base, retuse at the apex with mostly 2 (sometimes 3) teeth unequal in length; indusium semicylindrical, proportionally broadly winged by the edges of the lobules, the apex ± reaching the sinus between the teeth.

Forma typica: Outer tooth of the soriferous lobules sometimes elongated to a short, straight horn; indusium 2—3 × as long as broad. — *Java* (*Mt. Gede*, J. G. Hallier No. 671).

Var. elegantior: Lobuli soriferi dente exteriore saepe valde elongato, incurvato, corniformi, dente interiore interdum elongato; indusium 3—4 × longius quam latum, infra apicem saepe paullo angustatum. — *Java* (*Mt. Soenggaboewana*, C. A. Backer No. 23827).

Dennstaedtia canaliculata, v. A. v. R., Bull. Btz., *1914*, XVI, 6; Mal. Ferns & All., Suppl. I, 126.

Var. obtusata: Pinnulae sat obtusae, usque ad 2 cm. latae, basi truncatae; segmenta ultima horizontalia vel subhorizontalia. — Stipites longissimi, basin versus aculeolato-asperi. — *Sumatra (Bengkoelen, Lebong Simpang*, C. J. Brooks No. 342/S).

Dennstaedtia penicillifera, v. A. v. R. (not D. grandifrons, *Christ*) this Bull., tab. I; *Hypolepis grandifrons, Gepp*, in Gibbs, Contr., 195.

Sori deflexed; indusium cup-shaped.
New Guinea.

Dictyopteris carinata, v.A.v.R.

Arcypteris. — Stipites ala exclusa ± 20—25 cm. longi, squamis patentibus, deciduis, fuscis, lineari-subulatis, integerrimis ornati. Frondes herbaceae, glabrae, oblongo-spathulatae, ± 65 cm. longae, parte inferiore anguste alaeformes, decurrentes, parte superiore ± 45 cm. longae et 30 cm. latae, pinnatipartitae, acuminatae; costa subtus acute quadrangularis, lateraliter canaliculata, supra plana sed carina prominenti munita. Segmenta infra apicem sinuatum, subulatum ± 9 — 10 utrinque, inferiora sat remota, superiora sensim minora et magis conferta, maxima lanceolato-subulata, $17^1/_2$ — $22^1/_2$ cm. longa et $2^1/_2$ — 4 cm. lata, acuminata, late subsinuato-repanda, basi ala sat lata connata; costulae prominentes; venae primariae distinctae, obliquae, marginem fere attingentes; areolae numerosae, venulas liberas includentes. Sori abundantes, parvi, irregulares, partim confluentes.

Sumatra (*Bengkoelen, Lebong Tandai,* C. J. Brooks No. 379/S).

Dictyopteris hemiteliiformis (Rac.), v. A. v. R., in Bull. Btz., *1913,* XI, 7; Mal. Ferns & All., Suppl., 321; *Pleocnemia Leuzeana, Pr., var. hemiteliiformis,* Rac., Flor. Btz., I, 194; v. A. v. R., Mal. Ferns, 173; *Aspidium Leuzeanum, Kze, var.,* C. Chr., Ind. Fil., 79.

Rachises naked in the adult fronds.

Also in *Sumatra (Deli, Bandarbaroe,* J. A. Lörzing No. 4330).

Diplazium porphyrophyllum, v.A.v.R.

Eudiplazium. — Rhizoma ascendens. Stipites approximati, 2 — 12 cm. longi, cum costa (rachide) squamulis copiosis, squarrosis, atro-brunneis vestiti. Frondes plus minusve coriaceae, glabrae sed subtus ad costulas copiose et ad venas parce obscuro-squamulosae, subspathulato- vel lineari-oblanceolatae, acuminatae, profunde pinnatifido-pinnatipartitae, parte inferiore sensim angustatae, basi non raro pinnatae. Segmenta subhorizontalia, approximata, subrecta ad falcata, integerrima vel apice crenulata, obtusa ad acuta; segmenta mediana vel supramediana maxima, ± $^3/_4$ — 1 cm. lata; segmenta inframediana sensim minora, infima subsemiorbicularia et quam lata vix longiora vel alaeformia et quam longa multo latiora; venae plus minusve obliquae, usque ad 10 —18 utrinque, plerumque furcatae (infra mediam), superiores simplices. Sori interdum breves et ad venas terminales, plerumque longi et costulam marginemque attingentes vel fere attingentes; indusium brunneum.

The two specimens on which this description is based are not quite identical, but they are too closely allied to keep them separated. — Near D. porphyrorachis *Diels* and D. porphyrolepium *v.A.v.R.*

Sumatra (*Lebong Simpang,* C. J. Brooks No. 322/S), *Ceram* (*Wai Lantabi,* L. Rutten's Explor. Commiss., Coll. Kornassi No. 1240).

Diplazium montanum, v. A. v. R.

Eudiplazium. — D. pallido *Moore* affine sed pinnis tenuioribus, subherbaceis; pinnis lateralibus magis ascendentibus, sat rectis, majoribus, maximis ± 18 — 19 cm. longis et 2 — $2^{1}/_{2}$ cm. latis, serrulato-crenulatis, basi subaequilateralibus et obrupte cuneatis ad rotundato-truncatis; pinna terminali pinnis lateralibus similis i. e. basi non lobata; venis furcatis, venulis posticis plerumque ipse furcatis.

Pinnae pale-yellow-brown when dry; soriferous veins dark-brown; indusia pale-yellow-brown, with a golden-yellow margin.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 330/S).

Diplazium furculicolum, v. A. v. R.

Eudiplazium. — Rhizoma breve, cum basibus stipitum squamis ovatis, acutis, integerrimis, fuscis vestitum. Stipites approximati vel fasciculati, fusci, glabri (glabrescentes?). Frondes herbaceae, glabrae, plus minusve fusco-olivaceae, elongato-lanceolato-ovatae, 30—50 cm. longae, acuminatae, 2-pinnatae, infra pinnam terminalem saepe proliferae; rachides nigro-fuscae, subnigro-fibrillosae. Pinnae 6—16 in utroque latere rachidis; pinna terminalis parva, lanceolata, infra apicem acuminatum subserratumque profunde pinnatifida; pinnae laterales remotae, inframediales maximae, ± horizontales, leviter falcatae, lineari-sublanceolatae, 10—15 cm. longae, supra basin 3—4 cm. latae, parte superiore infra apicem acuminatum subserratumque profunde pinnatipartitae, parte inferiore pinnatae. Segmenta usque ad 16-paria, oblonga, superiora leviter obliqua, adnata vel confluentia, inferiora ± horizontalia, libera, remota, sessilia vel subpetiolulata; segmenta maxima usque ad $1^{1}/_{2}$ cm. longa et $^{3}/_{4}$ cm. lata, obtusa, partim integerrima, partim irregulariter serrato-crenata vel usque ad $^{1}/_{2}$ costam versus in lobulos serrato-crenatos incisa, basi truncato-cuneata; venae usque ad 6 utrinque, superiores simplices, centrales et inferiores furcatae vel in lobulos parce pinnatae. Sori lineares, $^{3}/_{4}$ partes inferiores venularum anteriorum venarum furcatorum vel venularum infimarum venarum pinnatarum occupantes; indusium firmum, persistens, castaneum.

Ceram (*Hatoemete Pass,* L. Rutten's Explor. Commiss., Coll. Kornassi No. 596).

Diplazium silvestre, v. A. v. R.

Eudiplazum. — Stipites ± $12^{1}/_{2}$ — $22^{1}/_{2}$ cm. longi, cum rachide fusci, obtuse tetragoni et supra canaliculati (in sicco specie trigoni et sulcati), laeves, parce fusco-squamulosi, glabrescentes. Frondes coriaceae, glabrae, supra obscure olivaceae, subtus pallidiores, lineares vel elongato-ovatae, ± 15 cm. longae, $3^{1}/_{2}$ — 7 cm. latae, 2-pinnatae, sub-3-pinnatae. Pinnae ascendentes, infra pinnam terminalem ± 10 — 12 utrinque; pinnae terminales pinnulis terminalibus plus minusve similes; pinnae inferiores breviter petiolulatae; pinnae maximae usque ad 4 cm. longae et $1^1/_2$ cm. latae. Pinnulae infra pinnulam terminalem usque ad ± 5 utrinque; pinnulae terminales rhomboideo-lanceolatae, usque ad 2 cm. longae, obtusae, serratae, basi cuneatae decurrentesque et saepe lobatae serrataeque, serraturis simplicibus vel serrulatis; pinnulae laterales minores, ascendentes, cuneato-obovatae, margine exteriore obtusae, serratae, basi acutae; pinnulae inferiores maximae, usque ad 1 cm. longae, breviter petiolulatae, basi interdum parce pinnatae, foliolis ultimis minutis, cuneato-obovatis, serrulatis; venae erecto-patentes, plerumque simplices. Sori lineares, costulam marginemque attingentes, interdum diplazioidei; indusium brunneum, persistens.

Ceram (*Hatoemete Pass*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 609.

Diplazium aculeatum, v. A. v. R.

Eudiplazium. — Stipites cum rachidibus pallide flavido-fusci, spinis acutis, nigris, sparsis aculeati, ferrugineo-furfuracceo-tomentosi. Frondes deltoideae, ± 60 — 80 cm. longae, 3-pinnatipartitae. Pinnae remotae, breviter petiolatae, infimae horizontales, lineari-lanceolatae, in medio ± 7 — 10 cm. latae, acuminatae. Pinnulae herbaceae, glabrae, paullo remotae, horizontales, subsessiles, lineari-oblongae, maximae 1 — $1^1/_4$ cm. latae, infra apicem obtuse acuminatum serrato-crenatumque profunde pinnatipartitae; costae subtus parce fibrillosae, glabrescentes. Segmenta paullo remota, sinibus obtusis separata, infima horizontalia, cetera patentia, maxima lineari-oblonga, ± 3 mm. lata, rotundato-subtruncata, serrato-crenata, basi dilatata; venae usque ad 4 — 5 utrinque, simplices. Sori costulares, breviter oblongi; indusium brunneum, rectum, juvenile probabiliter inflatum.

Near D. umbrosum *Bedd.*

Ceram (*Meseleïnanpas*, L. Rutten No. 367).

Diplazium sorzogonense, Pr., Tent, Pterid., 114; v.A.v.R., Mal. Ferns, 415 (includ. *D. speciosum Bl.).*

Forma javanica: Fronds large, to 180 cm. or more long; largest pinnae ± 25 cm. long by 4 — 5 cm. broad; lobes conspicuously serrate; veins 11 — 15 on a side. — *Java (Mt. Ragadjembanga,* C.A. Backer No. 16150).

Diplazium proliferum (Lam.), Thouars, Flor. Tr. d'Ac., 35; v.A.v.R., Mal. Ferns, 424; Supplem. I, 275; *Asplenium proliferum, Lam.,* Enc., II, 307.

My information given under Cyclopeltis Persliana *Berk.* regards also this species. The Buitenzorg specimens, as far as still provided with scales, have the scales minutely, horizontally denticulate, the teeth split at the tip into 2 horizontally spreading, decurvate-uncinate toothlets, as in D. ceratolepis *Christ* (Farnkr. d. Erde, 221, fig. 703).

Drymoglossum Brooksii, v.A.v.R.

Rhizoma repens, in sicco nigrum, squamis basi peltatis, juvenilibus lanceolatis, acuminatis, pallidis (subalbidis), graciliter denticulatis, adultis ovatis, obtusis, rufis vestitum. Stipites seriati, frondium sterilium ± 10 — 12 cm. longi, glabri (glabrescentes?), frondium fertilium longiores et in fronde sensim transientes. Frondes dimorphae. Frondes steriles coriaceae, glabrae (glabrescentes?), punctulis minutissimis, impressis, saepe nigris copiose munitae, ovatae, ± 9 — 10 cm. longae, ± $4^{1}/_{2}$ cm. latae, acutae vel acuminatae, margine recurvatae, repando-sinuatae et late crenulatae, basi late rotundato-cuneatae et leviter decurrentes; costa supra plana, subtus teres; costulae (main veins) prominentes, ascendentes, marginem fere attingentes; areolae irregulares; venulae liberae adsunt. Frondes fertiles angustissime lineares, cum stipite ± 35 cm. longae, juveniles 1 mm. latae, adultae forsitan paullo latiores, acutae, integerrimae. Sori longi, utrinque linea paullo elevata inclusi.

Very distinct, with the barren fronds as in Pleopeltis § Pleuridium and the fertile fronds as in Vittaria § Taeniopsis but apparently without paraphyses, stellate hairs or peltate scales.

Sumatra (*Bengkoelen, Lebong Simpang,* G. J. Brooks No. 361/S).

Drymoglossum metacoelum, v.A.v.R., this Bull., tab. II; *D. rigidum, Christ* (non *Hk.*), in Ann. Btz., XX, 129, p. p.

Rhizoma late repens, squamis brunneis, e basi lata peltataque filiformi-subulatis, basin versus minute denticulatis copiose vestitum. Stipites graciles, glabri, frondium sterilium ± $^{1}/_{4}$ — $1^{1}/_{4}$ cm., frondium fertilium ± $7^{1}/_{2}$ cm. longi. Frondes dimorphae. Frondes steriles firmiter coriaceae sed non percrassae, glabrae, ovatae vel obovatae, apice rotundatae, margine integerrimae et leviter incrassatae, vix reflexae, basi cordatae ad acuminatae; costa subflexuosa, apicem frondis non attingens, supra sulcata, subtus prominens; areolae (costales marginalesque exceptae) venulis liberis excurrentibus 1 — 2 munitae. Frondes fertiles lineares, ± 5 cm. longae, ± $1^{1}/_{2}$ — 2 mm. latae, obtusae, marginibus late et rectangulose reflexis, soris in angulis positis.

Very peculiar in having the edges of the fertile fronds rectangularly reflexed, the sori placed in the corners, the reflexed portions recurved when dry (and probably also in fresh material when young; fig. d" of the plate) and hiding the sori, flat when boiled (and probably also in fresh material when ripe; fig. d' of the plate).

Borneo (*Liang Gagang,* Hallier No. 2942).

Drymoglossum tetragonum, v.A.v.R., this Bull., tab. III; *D. rigidum, Christ* (non *Hk.*), in Ann. Btz., XX, 129, p. p.

D. rigido *Hk.* affine sed frondibus minoribus; frondibus sterilibus brevissime petiolulatis, areolis venulis liberis paucis, saepe excurrentibus munitis; frondibus fertilibus (cum siccis tum madefactis) obtuse quadrangularibus, i. e. supra subtusque sat applanatis, lateribus leviter convexis, sulcis soriferis in sectione transverali parallelis.

D. rigidum *Hk.* differs in having the fronds larger, the barren fronds on stalks as long as themselves, the areolae without free venules, the fertile fronds subsemiterete, i.e. convex above, rather flat baneath, the soral grooves with the mouths remote and the bottoms approximated (conf. Hooker in Icon. Pl., X, tab. 996).

Borneo (Teuscher).

Dryopteris subulifolia, v.A.v.R.

Lastrea. — Rhizoma ascendens, squamis paucis, subalatis, fuscis, villosis. Stipites approximati, ± 20 — 30 cm. longi, pallide griseo-fusci, dense pallide brevi-puberuli, auriculis (pinnis reductis) remotis, rotundatis, 1 mm. diametientibus muniti. Frondes e basi lata subsubuliformes, ± 20 — 30 cm. longae, ± 6 — 8 cm. latae, acuminatae, rachide pilis longiusculis curvatisque dense pallide villosa. Pinnae firmiter herbaceae, infra pinnam terminalem ± 25 — 30 utrinque; pinnae terminales subulato-deltoideae, apice crenatae, basin versus sensim profunde pinnatifidae; pinnae laterales approximatae vel sat remotae, basales vel suprabasales maximae, sessiles vel subsessiles, sat horizontales, lineares, usque ad 4 cm. longae et $^3/_4$ — 1 cm. latae, apice acuminato crenatae, margine usqe ad $^3/_4$ costam versus incisae, basi plus minusve trunc-, atae; costa supra partim breviter puberula, partim acute longe setosa subtus copiose appresso-hirsuta. Lobi approximati, lineari-oblongi, 1 — $1^1/_2$ mm. lati, obtusi, integerrimi, ciliati, sinibus obtusis separati; costulae venaeque supra glabrae vel parce setulosae, subtus appresso-setulosae; venae 3 — 4 utrinque, simplices, obliquae. Sori ad venas mediales; indusium persistens, puberulum.

D. Beddomei *O. Ktze* differs from this principally in having the lower pinnae gradually reduced, and the sori ternimal on the veins.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 334/S).

Dryopteris obtusata, v.A.v.R.

Lastrea. — Stipites fasciculati, ± 10 — $12^1/_2$ cm. longi, cum rachide pallide fusci et dense villosi; pili ochracei, squamulis subulato-triangularibus, leviter crispis, patentibus, sparse intermixti. Frondes elliptico-lanceolatae, ± $17^1/_2$ — 25 cm. longae et 7 — $8^1/_2$ cm. latae, acuminatae. Pinnae firmiter herbaceae, infra pinnam terminalem ± 12 — 14 utrinque; pinnae terminales triangulares, apice acuminato integerrimae, basin versus sensim profunde pinnatifidae; pinnae laterales approximatae, lineari-oblongae, mediales vel inferiores longissimae, breviter petiolulatae, costa supra hirsuta, subtus pilosa glandulosaque; pinnae mediales horizontales, inferiores sensim valde deflexae; pinnae maximae $3^1/_2$ — $5^1/_2$ cm. longae et 1 — $1^1/_4$ cm. latae, apice obtuso angustatae integerrimaeque, ceterum profunde pinnatifidae, basi truncatae; pinnae reductae desunt. Lobi conferti, lineari-oblongi, $2^1/_2$ — 3 mm. lati, rotundato-truncati, integerrimi, ciliati, supra ad et inter venas copiose ochraceo-puberuli, subtus ad et inter venas flavido-glandulosi; venas 4 — 5 utrinque, simplices. Sori plerumque ad venas infimas anteriores solitarii et mediales vel inframediales; indusium brunneum, persistens, parce indistincteque glandulosum.

Sumatra (*Bengkoelen, Lebong Simpang*, C. J. Brooks No. 339/S)

Dryopteris diversivenosa, v.A.v.R.

Lastrea. — D. mediae *v. A. v. R.* valde affinis sed: Stipites in sicco straminei, parcissime squamulosi, ceterum glabri; frondes minores; rachis straminea, supra graciliter et copiose sed non dense villosa, ceterum glabra; pinnae leviter remotae, angustiores; costae costulaeque supra villosae, subtus glabrae vel parce pilosae; lobi infimi non profundius incisi; venae magis numerosae, usque ad 15 utrinque, venulis saepe indistinctissimis; sori venarum infimarum interdum 2-ni; indusium majus, pallide fuscum.

D. media *v. A. v. R.* has the stipe and rachis when dry fuscous, deciduously and finely puberulous; the rachis and costae densely villose above, finely puberulous beneath; the indusium fuscous.

Sumatra (*Tanang Taloe*, H. A. B. Bünnemeijer No 1104).

Dryopteris Wigmanii (Rac.), C. Chr., Ind. Fil., 401; v.A.v.R., Mal. Ferns, 191; *Aspidium Wigmanii, Rac.*, in Bull. Ac. Crac., *1902*, 61.

Also in *Ceram* (*Kabailoe Kabohari*, L. Rutten No. 243).

Dryopteris decursive-pinnata (v. Hall), O. Ktze, Rev. Gen. Pl., II, 812; *Polypodium decursivo-pinnatum, v. Hall*, Nieuwe Verh. v d. Ned. Inst., V, 294*c*, tab. 1836; Hk., 2nd Cent. of Ferns, tab. IL.

Also in *Celebes* (S. H. Koorders No. 53*c*; Hort. Bog., II, K (VIII, 13).

Dryopteris horridipes, v.A.v.R.

Nephrodium. — D. feroci *O. Ktze* subsimilis. Stipites cum rachide supra basibus persistentibus squamarum fuscarum caducarum mox valde asperi, sat horridi, ceterum basibus ± persistentibus villorum pallidorum deciduorum dense, gracillime punctulato-asperuli, hic illic laeves; pinnae subtus ad et inter costas, costulas venasque densissime villosae; venae usque ad 15 utrinque, 3 — 4 inferiores anastomosantes; sori indusio minuto villosoque.

Sumatra (*Mt. Talamau*, H. A. B. Bünnemeijer No. 964).

Dryopteris arborea, v.A.v.R.

Nephrodium. — Arborescens, usque ad ± 5 m. alta, trunco gracili. Stipites proportione breves, usque ad 10 cm. longi, basin versus parce fusco-subulato-squamosi, cum rachide fusci et pilis copiosis, rufis, appressis ad patentissimis villosi vel hirsuti. Frondes lanceolatae, ± 90 — 100 cm. longae, rachide subtus ad basin pinnarum aërophoris prominentibus munita. Pinnae dimorphae, sat remotae, sessiles, papyraceae ad subchartaceae, glabrae; pinnae steriles lineari-lanceolatae, centrales maximae, ± 15—17 $^1/_2$ cm. longae et 2—2 $^1/_2$ cm. latae, infra apicem acuminatum integerrimumque grosse dentatae, appresso-ciliatae, basi truncatae vel subtruncatae, sub-2-auriculatae, costa appresso-villosa, venis primariis secundariisque certe subtus apresso-pilosis, venis secundariis usque ad 6 — 7 utrinque, 4 — 5 inferioribus anastomosantibus; pinnae inferiores magis remotae et sensim reductae auriculiformesque; pinnae fertiles usque ad 6 cm. longae et 1 $^1/_2$ cm. latae, integerrimae vel subintegerrimae. Sori ad venas secundarias mediales, inter venas primarias usque ad 5-pari, sat crebri; indusium parvum, ciliatum, inter capsulas mox absconditum.

Ceram (*Kaloa,* L. Rutten No. 161).

Dryopteris urophylla (Wall.), C. Chr., Ind. Fil., 299; *D. moulmeinensis, C. Chr.*, l. c., 278; v.A.v.R., Mal. Ferns, 216 — 217; *Polypodium urophyllum, Wall.*, List, No. 299.

The two ultimate forms of this species occurring in the Buitenzorg Herbarium are united bij so many intermediates, that it is impossible to draw the precise line of demarkation.

Var. Teysmannii: Pinnae proportione breves lataeque, subellipticae, abrupte caudatae, utrinque copiose puberulae, pilis posticis glandulis minutissimis, numerosis, rotundis, flavidis intermixtis. — *Sumatra* (*Loeboe Alang*, Teysmann).

Dryopteris lineata (Bl.), C. Chr., Ind. Fil., 275; v.A.v.R., Mal. Ferns, 209; *Aspidium lineatum, Bl.*, Enum. Pl. Jav., II, 144.

Var. subacrostichoides (v. A. v. R., Mal. Ferns & All., Supplem. I, Corr., 50): Frondes minores; pinnae steriles oblongae, 2 $^1/_2$ — 3 $^1/_2$ cm. longae, 1 — 2 cm. latae, apicem obtusum vel subacutum versus sensim lobatae; pinnae fertiles valde contractae, ± 1 $^1/_2$ cm. longae, integerrimae; sori utrinque 3 — 4-seriati, confluentes; indusia minutissima, ciliolata. — *Sumatra* (*Kota Agoeng*, P. Cramer).

Resembles very much D. acrostichoides *v. A. v. R.* but the terminal pinna not elongated, nearly all the veins anastomosing.

Elaphoglossum minahasae, v.A.v.R., Mal. Ferns & All., Supplem. I, 527; *Acrostichum conforme, Christ* (not *Sw.*) in Ann. Btz., XV, 174.

Stipites 15 — 20 cm. longi, ± 1 $^1/_2$ cm. supra basin paullo incrassati, glabri vel squamulis ovatis, pallide fuscis, acuminatis, integerrimis vel parce fimbriatis sparse muniti. Frondes dimorphae. Frondes steriles rigide coriaceae, glabrae, ± $17^1/_2$ cm. longae et 3 cm. latae, basin decurrentem versus sensim angustatae, apice rotundatae, margine leviter pellucidae et subreflexae; costa utrinque leviter prominens et subcanaliculata; venae leviter prominentes, apicibus subtus stria intramarginali prominenti unitis. Frondes fertiles contractae, utrinque sensim angustatae, apice obtusiusculae. — Rhizoma?

Celebes (Minahasa, Menado, S. H. Koorders No. 17097*β*).

Gleichenia Warburgii, Christ, in Ann. Btz., XV, 78 (not XX, 139); v.A.v.R., Mal. Ferns, 58.

Primary branches not rarely provided on 1 side or on both sides (at the base and at the places of insertion of the pinnulae) with deeply pinnatipartite stipules. — Nieuwenhuis' No. 525 from *Borneo* is G. linearis *Clarke* var alternans.

Also in *Ceram* (*Kaloa,* L. Rutten No. 146).

Gleichenia conversa, v. A. v. R., Bull. Btz., *1915,* XX, 17.

Also in *Sumatra* (*Mt. Talamau,* H. A. B. Bünnemeyer No. 884).

Hemitelia subconfluens, v.A.v.R.

Amphicosmia. — Stipites sursum cum rachide leviter asperuli. Frondes ± 80 cm. latae, 3-pinnatae; rachides cum parte superiore stipitis villoso-tomentosae, pilis squamulis paucis, fuscis deciduisque intermixtis; pili antici rufi, recti aut curvati, subappressi, postici ferruginei, crispati; squamulae rachidis primariae anguste longeque subulatae vel subfiliformes, rachidum secundariarum lanceolatae, acuminatae. Pinnae subhorizontales, breviter petiolulatae, contiguae, supra basin ± 10 — 12 cm. latae, acuminatae. Pinnulae horizontales vel patentes, lineares, maximae ± 6 cm. longae et $1^3/_4$ cm. latae, pinnatae, apicem breviter et obtuse acuminatum versus profunde pinnatipartitae; pinnulae inferiores breviores; costae (rachides tertiariae) supra rufo-hirsutae, subtus crispato-pilosae et parce squamulosae. Segmenta firmiter herbacea, glabra, subremota, lineari-oblonga, $2^1/_2$ — 3 mm. lata, obtusa, obtuse dentata; segmenta inferiora breviora, sessilia vel subpetiolulata, lobato-dentata; costulae leviter pilosae, pilis posticis praesertim basin pinnularum versus squamulis ovatis, ± bullatis, fuscis, acuminatis intermixtis; venae usque ad 6 — 8 utrinque, furcatae, superiores simplices, glabrae vel supra parce pilosae. Sori costulares, approximati; indusium minutum, persistens.

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 775).

Hemitelia perpunctulata, v.A.v.R.

Amphicosmia. — Stipites deorsum . . . . . ?, sursum cum rachide primaria in sicco fusci vel subcastanei, juveniles probabiliter copiose squamulosi et furfuracei, demum glabri, punctulis copiosis, minutis, punctis paucis majoribus intermixtis asperi; squamulae longe filiformes, leviter crispatae, brunneae vel castaneae; furfur ferrugineus. Frondes 3-pinnatifidae. Pinnae sessiles, basi articulatae, usque ad 50 cm. vel plus longae, acuminatae; rachides secundariae supra pilis castaneis, incurvatis hirsutae, ceterum rachide primaria similes. Pinnulae numerosae, sessiles, basi articulatae, firmiter herbaceae, glabrae, e basi late truncata lanceolatae, centrales maximae, 8 — 9 cm. longae, ± $1^3/_4$ cm. latae, fere usque ad costam pinnatipartitae, apice relative abrupte longe acuminatae et serrato-dentatae; costae supra ferrugineo-hirsutae, subtus squamulosae; squamulae inferiores planae, longe subulatae, brunneae, squamulis minoribus, piliformibus, paucis intermixtae; squamulae superiores sensim bullatae, ovatae, acuminatae, ferrugineae. Lobi patentes, falcati vel subfalcati, inferiores fere usque ad 1 cm. longi, ± 2 — $2^1/_2$ mm. lati, obtusi, crenati; costulae supra glabrae, subtus certe basin versus parce bullato-squamulosae; venae usque ad 10 — 12 utrinque, furcatae, superiores simplices. Sori usque ad ± 6 utrinque, subcostulares, ad venas inferiores positi; indusium rudimentare, brunneum.

Sumatra (*Mt. Kaboeng*, H. A. B. Bünnemeijer No. 1219).

Hemitelia arfakensis (Gepp), v.A.v.R.; *Alsophila arfakensis, Gepp*, in Gibbs, Contr., 70.

Indusium present, breaking down irregularly, at length consisting of a half whorl of red-brown, fibril-like fragments.

New Guinea.

Histiopteris incisa (Thb.), J. Sm., Hist. Fil., 295; v.A.v.R., Mal. Ferns, 349; *Pteris incisa, Thb.*, Prod. Flor. Cap., 171.

Var. fibrillosa: Forma typica similis sed pinnulis subtus ad venas pilis articulatis fibrillosis. — *Sumatra* (*Bengkoelen*, *Lebong Simpang*, C. J. Brooks No. 290/S).

Histiopteris reniformis, v.A.v.R.

Pinnulae basilares stipuliformes parvae, reniformes; pinnulae ceterae remotae, horizontales, herbaceae, glabrae, sessiles, maximae in specimine usque ad 8 cm. longae et infra medium 2 cm. latae, integerrimae, apicem obtusiusculum vel acutiusculum (non acuminatum) versus angustatae, basi cordatae et interdum auriculatae; areolae elongato-hexagonae, oblique patentes, venulis liberis carentibus vel rarissimis. Sori ...... ?

Sumatra (*Bengkoelen*, *Lebong Simpang*, C. J. Brooks No. 289/S).

Humata pusilloides, Copel., in Saraw. Mus. Journ., II (III), 338.

This species is unknown to me since we do not possess authentic material and Copeland's diagnosis of it. We have in the Buitenzorg Herbarium 3 plants from *Borneo* (all determined by Christ as *Davallia alpina*

Bl.) doubtfully referred by me to H. pusilla *Carr.;* two of these are sterile, and undeterminable but positively distinct from the 3rd (Hallier No. 3317), which may be Copeland's H. pusilloides. At any rate the latter, as well as Kornassi's No. 735 from *Ceram* (*Makoeala Ina,* L. Rutten's Explor. Commiss.), fits nearly Copeland's key of Bornean ferns and is distinguished by the following characters:

Rhizoma longe repens, in sicco brunneum, albido-pruinosum, squamis brunneis, subulato-lanceolatis, erectis, decidue vestitum. Stipites sparsi, frondium sterilium $^1/_4$ — 1 cm., fertilium 1 — 4 cm. longi, glabri vel parce squamulosi. Frondes rigide coriaceae, glabrae. Frondes steriles late cordato-ovatae, ± 1 — 2 cm. longae et latae, apice obtuso parce flabellato-lobatae, basi profunde pinnatipartitae; segmenta primaria conferta vel approximata. usque ad 4 in utroque latere, superiora ascendentia, sublineari-oblonga, obtusa, inferiora horizontalia, postice producta, frondium minimarum antice integerrima vel subintegerrima, postice lobata ad pinnatifida, frondium maximarum antice pinnatifida, postice profunde pinnatipartita, segmentis infimis posticis maximis et latere postico lobatis; segmenta ultima integerrima vel apice obtuso subcrenulata. Frondes fertiles 2 — 3 cm. longae et fere aequilatae, subpinnatae, rachide incrassato-2-marginata; segmenta primaria usque ad 6 utrinque, remota; rami ramulique acute falcato-dentati, dentibus maximis corniculato-productis. Sori ad basin anticam dentium positi; indusium transverse oblongum ad subreniforme.

Hymenolepis spicata (L. f.) Pr., Epim., 159; v.A.v.R., Mal. Ferns, 728.

Var. Bakhuizenii (v. A. v. R., Supplem. I, Corr., 59): Rhizoma squamulis lanceolato-subulatis, ciliato-dentatis ornatum, Frondes flaccido-coriaceae, 25 — 35 cm. longae, 4 — 6 cm. latae. Spicae 3 — 5 mm. latae, in $^1/_4$ — $^1/_2$ parte inferiore non raro steriles. — *Java (Preanger Regencies; Tjibeber,* R. C. Bakhuizen van den Brink, J. J. Smith No 730; *Mt. Bèsèr* C. A. Backer No. 22670).

Hymenolepis brachystachys (Hk.), J. Sm., Ferns Brit. & For., 92; v.A.v.R., Mal. Ferns, 729; *H. spicata, Pr., var. brachystachys,* Hk., Gard. Ferns, tab. 3.

Var. mirabilis (this Bull., tab. IV): Frondes spathulatae, parte inferiore anguste lineari-cuneatae, integerrimae, parte superiore latae, laciniis exclusis plus minusve oblongae, longe acuminatae, margine irregulariter incisae; laciniae obliquae, breviter dentiformes ad longe subulatae, integerrimae vel oblique serratae ad irregulariter incisae; costulae obliquae, simplices vel in laciniis decompositis interdum ramosae; sori in laciniis positi.

The description is taken from a living plant found (not cultivated) bij Mr. H. J. Wigman Jr. in the Buitenzorg Gardens.

The sori are, as the few ones of the still young plant show, short and unilateral, placed on the posterior side of the costulae. The reference to H. brachystachys is, in spite of the very peculiar shape of the six fronds which are all alike in the specimen found, unmistakable, seeing the creeping rhizome, the articulated sessile fronds, the protection of the young sori by the partially recurved edge of the laciniae and the long-stalked peltate scales scattered among the capsules.

If this very pretty variety proves to be a constant one, it is a valuable acquisition for our room- or green-house-flora.

Hymenophyllum rufifolium, v.A.v.R.

Leptocionium. — Rhizoma longe repens, parce pilosum. Stipites remoti, filiformes, 1 — 3 cm. longi, cum rachide pilosi, demum glabri. Frondes oblanceolatae, 3 — 5 cm. longae, 1 — $^1/_2$ cm. latae, rachide non vel in parte superiore solum alata. Pinnae tenues, glabrae, in sicco rufae, ascendentes, latere anteriore furcatae vel parce et profunde pinnatifidae, inferiores sessiles vel breviter petiolulatae, superiores adnatae, basibus decurrentibus hinc inde connatae. Segmenta obliqua, usque ad 6 mm. longa, simplicia vel furcata, ultima $^1/_2$ — 1 mm. lata, apice obtusa, marginibus remote serrata, serraturis obliquis, elongatis. Sori in pinnis superioribus axillares, ad segmenta abbreviata et saepe contracta terminales; indusium obovatum, proportione angustum, ± usque ad medium incisum, basi acute obconicum, gibbis glanduliformibus, vix perspicuis saepe munitum, valvis margine exteriore rotundatis et fimbriato-dentatis; receptaculum exsertum, fragile.

Sumatra (Mt. Talamau, H. A. B. Bünnemeijer No. 925).

Hymenophyllum rufifrons, v.A.v.R.

Leptocionium. — Rhizoma repens, gracile, parce longe pilosum. Stipites sparsi, ± 1 — 3 cm. longi, subfiliformes; cum rachidibus costis costulisque parce ferrugineo-pilosi, Frondes lineari-oblongae vel -lanceolatae, 7$^1/_2$ — 15 cm. longae, 2 — 4 cm. latae; rachis primaria inter pinnas (2 — 3 inferiores exceptas) alata. Pinnae firmiter membranaceae, glabrae vel ad venas parcissime pilosae, in sicco rufae, obliquae, confertae vel imbricatae, usque ad alam latam in pinnulas simplices, furcatas vel parce pinnatifidas incisae. Segmenta ultima $^1/_2$ — 5 mm. longa, ± 1 mm. lata, obtusa, remote serrulata, serraturis obliquis, brevibus et rectis vel paullo elongatis et leviter hamatis; venae 1 in segmentis ultimis. Sori saepe ad basin anticam pinnularum solitarii, segmentos abbreviatos terminantes; indusium ± $^1/_2$ basin versus 2-valve, basi acuta, anguste alata, extus minutissime glandulosa, valvis triangulari-oblongis, apice obtuso gracillime eroso-serrulatis; receptaculum exsertum, fragile.

Very near H. serrulatum *C. Chr.*

Sumatra (Bengkoelen, Lebong Simpang, C. J. Brooks No. 295/S).

Hymenophyllum *hamuliferum*, v. A. v. R.

Leptocionium. — Caespitosum. Rhizoma longum, gracile, copiose ramosum, pilis deciduis, pallide ferrugineis munitum, demum glabrescens. Stipites numerosi, $^3/_4$ — 3 cm. longi, graciles, cum rachide pallide ferrugineo-pilosi. Frondes lineari-lanceolatae vel ovatae, 5—7$^1/_2$ cm. longae, 1$^1/_4$—2$^1/_2$ cm. latae, tenues, glabrae vel ad costulas parce pilosae, in sicco fuscae, pinnatae, rachide primaria parte superiore alata, parte inferiore nuda vel anguste alata (2-marginata), ala integerrima. Pinnae ± 10 — 12 utrinque, patentes vel ascendentes, confertae vel approximatae, superiores adnatae, inferiores basi oblique cuneata sessiles, maximae rhomboideo-oblongae, usque ad 1$^1/_2$ cm. longae et 1 cm. latae, usque ad alam integerrimam profunde incisae. Pinnulae obliquae; pinnulae posticae 1 — 3, anticae 3 — 5; pinnulae superiores simplices vel furcatae; pinnulae anticae infimae furcatae segmentis simplicibus vel saepius 1—2 × furcatis. Segmenta ultima usque ad 5 mm. longa, $^3/_4$—1 mm. lata, obtusa, acute subuncinato-serrulata, costula solitaria munita. Sori ad pinnulas inferiores pinnarum, segmentos abbreviatos terminantes; indusium oblongum, apicem basinque versus plus minusve acute angustatum, usque ad $^1/_2$ basin versus 2-valve, parte inferiore 2-marginata vel alata, juvenili extus cristis longitudinalibus, indistinctis, 1 vel pluribus, apice caduce uncinato-appendiculatis munita; receptaculum longe exsertum, fragile.

Near H. serrulatum *C. Chr.*

Banca (*Mt. Permisan,* H. A. B. Bünnemeijer No. 2057).

Hypolepis Brooksiae, v.A.v.R.

Euhypolepis. — Frondes magnae, sub-5-pinnatae; rachides (ultimae exceptae) in sicco fuscae, spinulis acutissimis saepe nigris recurvatisque aculeatae. Pinnae horizontales, brevissime petiolulatae, deltoideo-lanceolatae, usque ad 27$^1/_2$ cm. longae et 10—12$^1/_2$ cm. latae. Segmenta tertiaria horizontalia, usque ad 2 cm. lata, obtusa vel breviter obtuse acuminata; tertiaria infima postica abbreviata, antica reducta; quaternaria sat horizontalia, inferiora subpetiolulata, usque ad $^1/_2$ cm. lata, obtusissima, subpinnata; segmenta ultima subhorizontalia, subrhomboideo-oblonga, usque ad 2 mm. lata, integerrima vel subintegerrima. Textura firmiter herbacea; rachides ultimae anguste alatae, cum costis costulisque subtus pilis articulatis parce fibrillosae. Sori ad vel prope basin anticam segmentorum ultimorum.

Near H. repens *Hk.* but more copiously divided. Resembles at first sight Dennstaedtia scandens and moluccana *Moore.* — The species is dedicated to Mrs. A. C. Brooks-*de Jongh.*

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 328/S).

Lecanopteris carnosa, *Bl.*, Enum. Pl. Jav., II, 120; Flor. Jav., II, tab. XCIV *A*; v.A.v.R., Mal. Ferns & All., Suppl. I, 407; *Polypodium Lecanopteris,*

Mett., Ann. Mus. Bot. L. B., II, 224; *P. patelliferum, Burck*, in Ann. Btz., IV, 96 p.p. (not tab. VII); — var. pumila; *L. pumila, Bl.*, l.c., tab. XCIV *B.*

Segments firm-herbaceous to subcoriaceous; fertile segments rather ascending, lanceolate or linear, deeply and obliquely lobed; lobes soriferous, oblong, broadly cymbiform or cupuliform in the fertile portion, with rather more than their own width between them, much inclined backwards, when dried pressed down backwards, not twisted, i.e. with the mouth of the cavity directed upwards; sori immersed, oblong or roundish.

Forma typica: Fertile segments subulate-lanceolalate, the largest 4 — 7 cm. long, $1^1/_2$ — 2 cm. broad, long-acuminate; sori broadly oblong, ± 4 — 5 mm. long. — *Java* (t. Blume), *Celebes (Tondano,* Teysmann; *Minahasa* Koorders Nos. 17011*β*, 17099*β*), *Moluccas* (t. Blume).

Var. pumila: Fertile segments linear, the largest 3 — $3^1/_2$ cm. long, ± $^1/_2$ cm. broad, blunt to shortly acuminate; sori roundish or suboblong ± 2 mm. long. — *Java* (t. Blume).

Lecanopteris deparioides, Bk., in Journ. of Bot., XIX, 366; *Davallia deparioides, Ces.*, Fel. di Bor., 13; *Cyathea deparioides, Ces.*, l.c., tab. IV.

Segments thin; fertile segments linear, ± 4 — 5 cm. long, $^2/_3$ — $^3/_4$ cm. broad, blunt, crenate-dentate; teeth soriferous, erecto-patent; sori small, terminal on the teeth, the cavities scutelliform (conf. Cesati's diagnosis), cymbiform or navicular (conf. Cesati's drawing), slightly twisted; areolae with only fine, free or anastomosing included venules. — Perhaps near L. philippinensis *v. A. v. R.*

Borneo (Beccari).

Lecanopteris davallioides, v. A. v. R., Bull. Btz., *1916,* XXIII, 14; v. A. v. R., Mal. Ferns & All., Suppl. I, 409 (excl. var.); *Polypodium patelliferum, Burck,* in Ann. Btz., VI, 96, p.p. (not tab. VII).

Segments coriaceous, relatively thick; fertile segments somewhat ascending, linear, the largest ± 4 — 6 cm. long by ± $^3/_4$ cm. broad, blunt or rounded at the apex, the edge obliquely repando-sinuate; lobules elongated on the anterior side into a soriferous outgrowth; outgrowths navicular, inclining forwards and inwards, when dried nearly always pressed down inwards and then generally laterally compressed and twisted, i.e. with the mouth of the cavity directed obliquely towards the margin of the pinna; sori immersed, occupying the whole of the outgrowths, the cavities therefore about as long as the outgrowths, ± 2 mm. long and 1 mm. deep; primary areolae of at least the lower half of the fertile segments provided with a thick, recurrent intermedial vein from which the free or anastomosing included venules are spreading in various directions.

Karimata (Teysmann).

Lecanopteris saccata, v.A.v.R.; *L. davallioides, v.A.v.R., var. macrocarpa,* v.A.v.R., Bull. Btz., *1916,* XXIII, 14; v.A.v.R., Mal. Ferns & All., Suppl. I, 409.

Segments herbaceous; fertile segments ascending, linear, the largest to ± 5 cm. long by $^1/_2$ cm. broad, blunt or bluntish at the apex, the edge obliquely repando-sinuate; lobules elongated into or provided with a soriferous outgrowth on the anterior side; outgrowths saccate, rather upright, slightly inclined inwards, when dried mostly pressed down inwards and then often laterally compressed and twisted, i.e. with the mouth of the cavity directed obliquely towards the apex of the pinna (inwards or outwards); sori immersed, occupying the whole of the outgrowths, the cavity therefore nearly as long as the outgrowth, about as deep as long; areolae with only fine, free or anastomosing included venules.

Forma typica: Cavities about $2^3/_4 - 3$ mm. long.— *Sumatra* (*Rimbo Pengadang,* Explor. Exped. E. Jacobson, Coll. Ajoëb No. 222).

Forma microcarpa: Cavities about $2^1/_4 - 2^1/_2$ mm. long.— *Sumatra* (*Bandar Baroe,* Lörzing No. 4302).

Lecanopteris Curtisii, Bk., in Journ. of Bot., XIX, 366; Hk., Icon. Pl., XVII, tab. 1607; v.A.v.R., Mal. Ferns & All., Suppl. I, 409; *Polypodium patelliferum, Burck,* in Ann. Btz., IV, 96, p. p., tab. VII.

Segments herbaceous to subcoriaceous; fertile segments spreading or ascending, linear, the largest ± 4 — 6 cm. long, $^1/_2$ — 1 cm. broad, blunt or rarely subacute at the apex, the edge obliquely repando-sinuate; lobules provided on the anterior side with a basal or subbasal soriferous toothlet; toothlets navicular, 1 — $1^1/_2$ mm. long, more or less (often very much) inclining forwards, when dried nearly always pressed down outwards and then erecto-patent or subparallel to the margin of the pinna and generally laterally compressed and twisted, i. e. with the mouth of the cavity directed mostly obliquely towards the margin of the pinna; sori immersed, occupying more than the whole of the toothlets, the cavities therefore longer than the toothlets, $1^1/_2 - 2$ mm. long, to 1 mm. deep; areolae with only fine, free or anastomosing included venules.

Sumatra (*Paloepoe,* Jacobson No. 2450; *Taloe,* Bünnemijer No. 149), *Lingga* (Teysmann No. 16615), *Java* (*Langkop/Tjitorek,* Backer No. 1755; *Tjidadap,* Bakhuizen van den Brink & Valeton Jr.), *Celebes* (*Tondano,* Teysmann No. 5296 *H.B.*).

Lindsaya subsemilunularis, v.A.v.R.; L. cultrata, *Sw.*, Christ, in Ann. Btz., XX, 133, p.p.

Eulindsaya. — Rhizoma breviter repens, squamulis sparsis (deciduis?), brunneis, breviter lanceolatis munitum. Stipites approximati, usque ad 2 cm. longi, cum rachide quadrangulares. Frondes lineares 10 — $17^1/_2$ cm.

longae, in parte media 2—2¼ cm. latae, simpliciter pinnatae, apice subacutae ad truncatae. Foliola tenuia, glabra, numerosa; foliola terminalia anguste cuneato-obovata ad late obdeltoidea; foliola lateralia clausa vel approximata, horizontalia, breviter petiolulata, deltoideo-oblonga vel subsemilunularia, maxima basi 4—6 mm. lata, recta vel paullo decurva, apice obtusa vel late rotundata, margine superiore et exteriore integerrima vel parce subcrenulata ad subrepandulo-crenulata, margine interiore rachidi parallela; foliola inferiora sensim minora et magis remota decurvataque; venae graciles. Sori recti, lineam interruptam intra marginem superiorem exterioremque formantes; indusium angustum.

Borneo (*Mt. Damoes*, Hallier No. 591).

Lindsaya ceramica, v.A.v.R.

Synaphlebium. — Rhizoma repens, rufum, glabrum (glabrescens?). Stipites sparsi, 20—25 cm. longi, fusco-straminei, obtuse angulosi, glabri. Frondes lineares, 15—20 cm. longae, 2—3 cm. latae, non ramosae vel ramo basali 1 utrinque munitae; rachis quadrangularis, fusco-straminea, glabra, in sicco 4-canaliculata; rami frondibus non ramosis similes sed breviores. Foliola herbacea, glabra, approximata vel contigua, breviter petiolulata, superiora obliqua, relative parva, cuneata, integerrima, oblique truncata, centralia maxima, ± horizontalia, rhomboideo-oblonga, 1—1½ cm. longa, ± ½—¾ cm. lata, anguste pellucido-marginata, margine interiore rachidi parallela, superiore in lobulos 3—5 (saepe 4), subquadrangulares, breves latosque, truncato-subrotundatos, integerrimos vel apice subcrenulato-repandos incisa, apice obtusa vel rotundato-truncata, margine inferiore saepe decurvata, basi oblique cuneata. Sori in lobulis solitarii, intramarginales, breviter lineares; indusium distinctum, herbaceum.

Ceram (*Woloe/Manoesela*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 707).

Lomaria Brooksii, v.A.v.R.

Rhizoma breve, erectum. Stipites fasciculati, glabri, angulosi, in sicco fusci vel olivaceo-fusci; frondium sterilium usque ad ± 25 cm., fertilium usque ad ± 75 cm. longi. Frondes lanceolato-ovatae; frondes steriles ± 30 cm. longae et supra basin 16 cm. latae, profunde pinnatipartitae, basi pinnatae, acuminatae. Segmenta subcoriacea, glabra, remota, linearia, plus minusve falcata, basi dilatata, integerrima, apicem acuminatum versus sensim dentata vel serrato-dentata, maxima usque ad ± 9 cm. longa et ± ¾ cm. lata; inferiora ± deflexa, libera, supra basin angustata; sequentia horizontalia vel patentia, ala angusta connata, sinu lato separata; venae simplices vel furcatae. Frondes fertiles pinnatae; pinnae ascendentes, breviter petiolulatae, contractae, ± 2—2½ mm. latae, integerrimae, subacutae.

Sumatra (Bengkoelen, Lebong Simpang, C. J. Brooks No, 333/S).

Lomaria Fraseri, A. Cunn., Hk., Icon. Pl., II, tab. 185; v.A.v.R., Mal. Ferns, 381; *Blechnum Fraseri, Luerss.*, in Flora, *1876*, 292; *C.* Chr., Ind. Fil., 154.

The discovery of the var. philippinensis in *Borneo* gives me cause to remember that the species has also been found in *Sumatra* some years ago (v. A. v. R., Bull. Btz., *1914,* XVI, 22). That habitat is not mentioned in Copeland's „Keys to the Ferns of Borneo" in Saraw. Mus. Journ., II (III) 387. Since a second specimen has been found in *Sumatra* (*Mt. Talamau,* H. A. B. Bünnemeijer No. 918).

I did not yet set eyes either on the type from *New Zealand* or on the variety from the *Philippines.*

Both Sumatran plants agree partly with Hooker's diagnosis and plate of the type, partly with those of Christ's var. philippinensis in Bull. Herb. Boiss., VI, 148, tab. II, but more with the former than with the latter.

The caudex is arborescent, slender (only $^1/_2$ — $1^1/_2$ cm. thick), the pinnae vary in width from $1^1/_2$ to 4 cm., the secondary segments are entire to crenate or dentate-serrate, the sori are golden-yellow or brownish-yollow, the indusia are brown or yellow-brown, eroso-denticulate and marginal, i.e. they consist of the recurved margin of the fertile segments.

If Christ's diagnosis and plate are correct, then his variety differs from the Sumatran specimens in having the sori rufo-orange, with the indusia grey, medial between the costa and margin, originating from the receptacle.

Marattia caudiformis, v.A.v.R.

Eumarattia.— M. caudatae *Copel.* affinis. Rachides parce squamulosae; pinnulae paullo latiores, maximae usque ad $17^1/_2$ cm. longae, $1^3/_4$ — 2 cm. latae, plus minusve abrupte et integerrime caudatae, subtus ad costam parce squamulosae; sori maximi loculis 10—15-paribus; indusium ferrugineum.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 309/S).

Marattia dolichocarpa, v.A.v.R.

Eumarattia. — Planta magna, usque ad ± 4 m. alta. Frondes 3-pinnatae, rachidibus glabris, fuscis, opacis. Foliola usque ad ± 10 in utroque latere rachidum secundariarum, coriacea, glabra, subtus albido-punctulata, quam faciem superiorem pallidiora, petiolulata, lineari-lanceolata, ± 10 — $12^1/_2$ cm. longa et 2 cm. lata, infra apicem acuminatum serratumque oblique et obtuse subbullato-crenata, basi oblique rotundato-truncato-cuneata, ad petiolulos decurrente; costae subtus parce squamulosae; venae subhorizontales, constante simplices, pellucidae. Sori a margine remoti, proportione longi, mediam venarum fere attingentes; synangia (semisori) maxima 20 — 30-locularia; indusium obsoletum, pilis minutissimis, vix conspicuis.

Ceram (*Kaniki,* L. Rutten's Explor. Commiss., Coll. Kornassi No. 540).

Mesochlaena talamauensis, v.A.v.R.

Stipites ± 25 — 75 cm. longi, cum rachide stramineo-fusci, basi fusci et squamis fuscis, lineari-subulatis, integerrimis, deciduis vestiti, sursum auriculis parvis (pinnis reductis), hastato-deltoideis muniti. Frondes lanceolatae, ± 65 — 125 cm. longae et 25 — 40 cm. latae, relative abrupte acuminatae; rachis supra pilis pallidis appresso-hirsuto-villosa. Pinnae subcoriaceae, utrinque glandulis minutis, rotundis, flavidis vel pallidis punctulatae, sat remotae, ascendentes, breviter petiolulatae, lineari-lanceolatae, inframediales maximae, ± 15 — 25 cm. longae et $2^1/_2$ — 3 cm. latae, apice acute acuminatae et integerrimae, margine costam versus plus minus usque ad $^1/_2$ incisae, basi abrupte breviter acuminatae, ad petiolos subdecurrentes; pinnae normales inferiores ± deflexae; costae, costulae venaeque utrinque sparse glandulosae, supra pilis pallidis, acutis ornatae; pili costarum densi, venarum sparsi. Lobi numerosi, conferti vel approximati, oblongi, 4 — 5 mm. lati, obtusi, integerrimi, ciliati; venae distinctae, usque ad 7 — 9 utrinque, 2 — 3 inferiores anastomosantes. Sori mediales; indusium pallide fuscum, margine decidue glandulosum.

Near M. larutensis *v.A.v.R.*,

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 873).

Microlepia Hookeriana (Wall.), Pr., Epim., 95; v.A.v.R., Mal. Ferns & All., Suppl. I, 229; *Davallia Hookeriana, Wall.*, List, 2684.

Under surface naked or minutely appresso-puberulous between the veins.

Also in *Sumatra* (*Bengkoelen, Lebong Simpang,* G. J. Brooks No. 331/S). — This specimen differs from our Javanese and British Indian specimens only in having the pinnae deciduous, apparently articulated to the rachis.

Nephrolepis floccigera (Bl.), Moore, Ind., 92; v.A.v.R., Mal. Ferns, 159; *Aspidium floccigerum, Bl.*, Enum. Pl. Jav., II, 147.

Pinnae subcoriaceous, chaffy beneath, glabrescent, to 15 cm. long, truncate-cuneate and often subauriculate at the upper base, rotundate or rotundate-cuneate at the lower base; barren pinnae $1^1/_2$ — 2 cm. broad, shallowly and broadly crenulate or duplicate-crenulate; fertile pinnulae narrower than the barren ones, dentate-crenate to a depth of $1^1/_2$ mm.; sori on the teeth.

Also in *Ceram* (*Kaniki,* L. Rutten's Explor. Commiss., Coll. Kornassi No. 555). — A large form, to 250 cm. high.

Nephrolepis serrata, v.A.v.R.

Eunephrolepis. — N. floccigerae *Moore* affinis sed pinnis minus firmis, glabris (glabrescentibus?), maxime ad costam subtus parce squamulosis, proportione longioribus angustioribusque, basi acutis, fertilibus conspicue serrato-dentatis.

Near N. floccigera but in aspect very distinct from it; longest fertile pinnae often sterile at the finely acuminate, serrate-crenate apex.

Ceram (*Hatoemete Pass*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 626).

Nephrolepis tomentosa, v.A.v.R., Bull. Btz., *1911*, I, 11; *1913*, XI, 17.

Also in *Sumatra* (*Fort de Kock*, H. A. B. Bünnemeijer No. 1248).

Nephrolepis pilosula, v.A.v.R., Bull. Btz., *1913*, XI, 18; Mal. Ferns & All., Suppl. I, 136.

From the presumable synonyms of this species (mentioned by me in Supplem. I, Corr., 48) may be concluded that I thought it possible that N. pilosula may be identical with N. rufescens *Pr.* (N. hirsutula *Pr.*, C. Chr., Ind. Fil., p. p.) and N. pilosa *Pr.*

H.I.H. Prince Roland Bonaparte was so kind to forward to me a copy of the diagnosis and of the plate of N. rufecens given by Wawra in Bot. Ergebn. etc., 200, tab. CI.

If the diagnosis and plate quoted are quite correct N. pilosula is certainly not indentical with N. rufescens and the latter not with N. hirsutula, though the 3 species are most closely allied. N. rufescens is drawn with the spores quite smooth while those of N. pilosula are rough with crowded, slightly elevated, verruciform projections.

It is possible that N. pilosula is indentical with N. pilosa. This may be settled by a botanist who has at his disposal a correct description of the species.

Ophioglossum Raciborskii, v.A.v.R.; *O. pedunculosum, Desv., var. lanceolatum*, v.A.v.R., Mal. Ferns, 775 — 776; *O. moluccanum, Schl., forma lanceolata*, Rac., in Nat. Tijdschr. N. I., LIX, 237, tab. II, fig. 4.

Rhizome short, ± erect, cylindrical. Whole plant 10 — 18 cm. high. Barren segment placed at, above or below the middle, lanceolate or oblanceolate, ± 3 – $4^1/_2$ cm. long, ± 1 — $1^1/_2$ cm. broad, blunt or acute, whether or not minutely mucronulate-apiculate, the base narrowed into a shortly linear-cuneate haft; marginal cells longitudinally linear, with the outer wall straight. Texture thin when dry; costa fine, somewhat stouter towards the base. Fertile spike on a peduncle 3 – 9 cm. long. — The description is taken from C. A. Backer's No. 23403, from *Klappa Noenggal*, near *Buitenzorg*, which differs from Raciborski's drawing only in having the areolae near the margin longitudinally elongated, not roundish. — O. pedunculosum *Desv.* differs in having the marginal cells short and broad, with the outer wall convex.

Java.

Ophioglossum pendulum, L., Spec. (Ed. 2), II, 1518; v.A.v.R., Mal. Ferns, 777.

Forma nutans: Also in *Sumatra (Bengkoelen, Lebong Simpang,* C. J. Brooks No. 356/S).

Phegopteris Rutteniana, v.A.v.R.; (? *Dryopteris oblanceolata, Copel.,* in Philipp. Journ., IX^c, 3).

Meniscium.— Rhizoma breviter repens, obscurum, glabrum. Stipites approximati, fusci, pilosi et squamulosi, glabrescentes, 3—$7^1/_2$ cm. longi. Frondes herbaceo-coriaceae, glabrae, saepe verruculosae, simplices, lineari-oblanceolatae, 10—30 cm. longae, parte superiore 2—4 cm. latae, acuminatae, integerrimae vel repando-undulatae, subcartilagineo-marginatae, basin minute 2-auriculato-cordatam versus sensim angustatae; costa prominens, supra sulcata hirsutaque; venae in utroque latere venarum primariarum 4—6, subprominentes.

Ceram (*Woloe/Manoesela,* L. Rutten's Explor. Commiss., Coll Kornassi No. 725).

Pleopeltis pseudo-acrostichum, v.A.v.R., this Bull., tab. V.

Eupleopeltis, Pleuridium.— Rhizoma longe repens, sat gracile, albido-pruinosum, demum nigricans, squamis deciduis, ascendentibus, ferrugineis vel pallescentibus, subulato-ovatis, acuminatis, irregulariter et minute eroso-denticulatis, basi peltatis dense vestitum. Stipites remoti, inter se $^1/_2$—1 cm. distantes, glabri, $^1/_2$—$7^1/_2$ cm. (vel plus?) longi, frondium sterilium breviores, frondium fertilium longiores. Frondes heteromorphae, rigide coriaceae, glabrae, punctis sparsis, saepe nigricantibus et impressis hinc inde munitae. Frondes steriles oblongae vel ovatae, 2—4 cm. (vel plus?) longae, $1^1/_2$—2 cm. (vel plus?) latae, apice obtusae vel rotundatae, margine cartilagineo anguste recurvatae et late (non profunde) crenatae, basi cuneatae et leviter decurrentes; costa supra sulcata, subtus prominens; costulae (main veins) ascendentes, subtus prominentes, marginem non attingentes; areolae absconditae. Frondes fertiles lineares, 5 cm. plus minusve longae, ± 4 mm. latae, planae, obtusae, marginibus parallelis, basi in stipitem sensim angustatae. Sori superficiales, utrinque 1-seriati, mediales, magni, rotundi, contigui, demum confluentes et pseudo-acrostichoidei, receptaculo anguste oblongo, costae parallelo.

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 830).

Pleopeltis pseudo-lateralis, v.A.v.R., this Bull., tab. VI.

Eupleopeltis, Pleuridium. — Rhizoma repens, lignosum, sat gracile, albido-pruinosum, demum nigricans, squamis deciduis, subulato-lanceolatis, suberectis, ferrugineis vel rufis, demum castaneis, graciliter longe acuminatis, irregulariter et minute eroso-denticulatis, basi subovatis peltatisque dense vestitum.

Stipites remoti, 1—15 cm. longi, glabri, frondium sterilium breviores, frondium fertilium longiores. Frondes heteromorphae, glabrae. Frondes steriles coriaceae (rigidae vel flaccidae), oblongae, ovatae vel lanceolatae, 2—10 cm. longae (raro longiores), 1—3$^1/_2$ cm. latae, apice late rotundatae vel obtuse acuminatae, margine cartilagineo saepe anguste recurvatae, subintegerrimae vel late (non profunde) crenulatae, basi cuneatae et leviter decurrentes; costa supra saepe plus minusve sulcata, subtus prominens; costulae (main veins) in frondibus rigidis sat absconditae, in frondibus flaccidis sat conspicuae, ascendentes, marginem non attingentes; areolae absconditae. Frondes fertiles anguste lineares, 7$^1/_2$—25 cm. longae, 2—3 mm. latae, in vivo crassissimae, supra in sicco conspicue concavo-canaliculatae, apice obtusae vel obtusiusculae, margine integerrimae, subrepandulae, basi longe decurrentes. Sori magni, remoti, utrinque 1-seriati, oblongi, costae paralleli, submarginales, specie laterales, sat superficiales.

Near Pl. de Kockii *v.A.v.R.*

Sumatra (*Mt. Talamau*, H. A. B. Bünnemeijer No. 772).

Pleopeltis Gibbsiae, v.A.v.R.; *Polypodium argyropus*, *Gepp* (not *Ridl.*), in Gibbs, Contrib., 75.

Ridley's *P. argyropus* is unknown to me but Miss Gibbs' No. 5689, from *Mt. Arfak*, does not agree with Ridley's incomplete diagnosis. A duplicate of Miss Gibbs' plant, which is very near Pl. de Kockii *v.A.v.R.*, is distinguished by the following characters:

Eupleopeltis, Pleuridium.— Rhizoma firmum, in sicco brunneum, albido-pruinosum, squamis suberectis, e basi lata peltataque subulatis, graciliter subcrispato-acuminatis, minutissime denticulatis, ferrugineis, demum decoloratis dense vestitum. Stipites remoti, $^1/_2$—3 cm. longi, frondium fertilium longiores, glabri, basi frondium anguste alati vel 2-marginati. Frondes dimorphae. Frondes steriles coriaceae, glabrae, ovatae ad lineari-lanceolatae, ± 4—8 cm. longae, 1 — 2$^1/_2$ cm. latae, obtusae vel obtusiusculae, margine incrassatae, recurvatae et late crenulatae, basi cuneatae vel rotundato-cuneatae; costa supra leviter sulcata, subtus prominens; venae primariae ± 10—20 utrinque, marginem fere attingentes, ascendentes, prominentes; venae secundariae absconditae vel prominentes. Frondes fertiles lineares, ± 12$^1/_2$ cm. longae, 3—5 mm. latae, in sicco planae vel canaliculato-complicatae, apicem et basin versus sensim angustatae, costa marginibusque iis frondium similibus. Sori magni, oblongi, superficiales, utrinque 1-seriales, costae paralleli.

Very near Pl. pseudo-lateralis *v. A. v. R.*

New Guinea.

Pleopeltis Beccarii, v. A. v. R., Bull. Dép. Agr. I. N., *1909*, XXVII, 4; *Polypodium Beccarii, v. A. v. R.*, *1908*, XVIII, 22; Mal. Ferns, 633.

Forma diplosora: Lower sori placed in oblique, confluent pairs, so as to form oblong sori oblique to the costa. — *Sumatra* (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 360/S).

Pleopeltis rupestris (Bl.), Moore, Ind., LXXVIII; v.A.v.R., Mal. Ferns & All., Suppl. I, 387: *Polypodium rupestre, Bl.,* Enum. Pl. Jav., II, 124; *P. triquetrum, Bl., var.,* C. Chr., Ind. Fil., 561, 571.

Var. subalbula, v.A.v.R., l.c. — Also in *Sumatra (Mt. Talamau,* H.A.B. Bünnemeijer No. 872).

Pleopeltis musifolia (Bl.), Moore, Ind., LXXIII; v.A.v.R., Mal. Ferns & All., Suppl. I, 391; *Polypodium musifolium Bl.,* Enum. Pl. Jav., II, 134.

Var. Schumanniana. — Also in *Ceram* (*Kaloa,* L. Rutten No. 139).

Pleopeltis pseudo-laciniata, v.A.v.R.

Eupleopeltis, Phymatopsis. — Pl. subtaeniatae v.A.v.R. affinis. Rhizoma squamis lineari-subulatis, obscure rufis vel castaneis, irregulariter denticulato-ciliolatis vestitum; pinnae minus coriaceae, remotae, omnes adnatae, basi conspicue dilatatae sed pinnae inferiores basi postica cuneato- vel rotundato-angustatae; pinnae superiores ascendentes, medianae patentes, inferiores horizontales vel ± deflexae.

Fronds commonly broader than long, suggesting Pl. laciniata *Bedd.,* which, however, is deeply pinnatifid into approximate segments.

Sumatra (H. A. B. Bünnemeijer; *Mt. Talamau* No. 889, *Mt. Merapi* No. 1275).

Pleopeltis lima, v.A.v.R.

Selliguea. — Pl. heterocarpae *v.A.v.R.* affinis sed frondibus fertilibus elongatis angustatisque et soris perprofunde immersis, supra costas altas angulosas formantibus.

The ridges are rather narrowly trapezoid in transversal section (/‾\) and give the fertile fronds the appearance of a very rough file when seen from above. — Pl. heterocarpa *v.A.v.R.* has the sori not deeply immersed, the ridges subsemiterete or slightly triangular in transversal section (⌒ /\).

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 313/S).

Polypodium caespitosum (Bl.), Mett., Ann. Mus. Bot. L. B., II, 219; v.A.v.R., Mal. Ferns, 582; *Grammitis caespitosa, Bl.,* Flor. Jav., II, 106, tab. XLVI, fig. 1.

Also in *Sumatra* (*Mt. Talamau,* H.A.B. Bünnemeijer No. 905*bis*).

Polypodium lasiosorum (Bl.), Hk., Spec. Fil., IV, 166; v. A. v. R., Mal. Ferns, 580; *Grammitis pusilla, Bl., var. lasiosora,* Bl., Flor. Jav., II, 110, tab. XLVI, fig. 6.

Specimens gathered on *Mt. Gede* (*Tjibodas,* Hallier No. 133) have the fronds thik-coriaceous, copiously provided on both sides with very short, dark hairs similar to those of the stipes, the veins are simple, or forked with 2 subequal branchlets, only visible when the fronds are boiled; the sori are crowded, confluent, not villous, but the sporangia are rather copiously setulose.

We have in the Buitenzorg Herbarium a plant from *Ceylon* (G. Wall No. 30) received as P. hirtellum. It is the plant meant by Beddome as P. lasiosorum in Ferns Br. I., II, tab. CLXXII and as P. hirtellum l.c. tab. CCXII, but it is, however, neither the former nor the latter. The specimen in hand is very small, copiously ciliated and hairy, the fronds are to 3 cm. long by 5 mm. broad, on stalks to 5 mm. long, the hairs are rufous, partly very long, partly very short, those of the upper surface rather few, of the under surface copious, those of the margin placed in tufts of 2 or more, the texture is firm but rather pellucid, the veins are invariably simple, bearing the sori at the base but not on abbreviated venules, the sporangia are apparently not setose but intermixed with hairs. — It is also not P. Reinwardtii *Pr.* and I propose to call it:

Polypodium Beddomeanum, v. A. v. R.; *P. lasiosorum Bedd.* (not *Hk.*). Ferns Br. I., II, tab. CLXXII; *P. hirtellum, Bedd.* (not *Bl.*), l.c., tab. CCXII.

Polypodium hirtellum, Bl., Enum. Pl. Jav., II, 122; *Grammitis pusilla, Bl.,* Flor. Jav., II, 109, tab. XLVI, fig. 4.

All our specimens are from *Java;* they have the fronds firm, more or less coriaceous, somewhat pellucid, provided partly with few, partly with copious long, reddish hairs, as are the stipes, the veins visible when seen towards the light, the lower often simple, the higher and central commonly once forked, or even twice forked to sparingly pinnate, with the branchlets varying from equal to very unequal in length, the sori not crowded, the sporangia partly setose or setulose.

Regarding Beddome's tab. CCXII in Ferns Br. I., II, see my information under P. lasiosorum *Hk.*

Blume's var. alpestris is unknown to me.

A. plant recently gathered in *Sumatra* (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 302/S) differs in having the fronds nearly naked. (Forma subcalva).

Polypodium cervicorne, *v.A.v.R.*

Eupolypodium, Furcata. — P. subdichotomo *Rac.* affine sed frondibus minoribus, usque ad ± 7$^1/_2$ cm. longis, cum stipite brevissime puberulis, segmentis usque ad 2 mm. latis, soris oblongis, sat remotis, non confluentibus, capsulis saepe breviter setulosis.

P. subdichotomum *Rac.* differs in having the fronds longer, long-hairy, the segments broader, the sori round or oblong, the capsules often long-setose.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 303/S).

Polypodium clavifer, Hk., Hk. Bk., Syn. Fil., 334; v.A.v.R., Mal. Ferns, 608; Suppl. I, 365.

Forma typica.—Also in *Ceram* (*Mt. Woloe,* L. Rutten's Explor. Commiss., Coll. Kornassi No. 704),

Polypodium gracillimum, Copel., Polypod. Philipp., 121; v.A.v.R., Mal. Ferns & All., Suppl. I, 350.

Var. setosum: Frondes breviores, latiores; segmenta majora, certe apicem versus setis longis parce ciliata.—*Sumatra* (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 301/S).

Polypodium brevivenosum, v.A.v.R.

Eupolypodium, Pinnata. — Rhizoma erectum, squamulis densis, ferrugineis, subfiliformi-subulatis, integerrimis, crispatis vestitum. Stipites conferti, cum rachide nigrescentes, $1-2^1/_2$ cm. longi, cum fronde pilis longis, rubidis ornati. Frondes subcoriaceae, subpellucidae, elongato-lanceolatae, 6—9 cm. longae, $^3/_4-1^1/_4-1^1/_2$ cm. latae, fere ad rachin incisae, apice acuminato subrepando-crenatae, basi paullo angustatae. Pinnae patentes, approximatae vel subremotae, usque ad $^3/_4$ cm. longae, $1^1/_2-2^1/_2$ mm. latae, obtusae, integerrimae, inferiores sat remotae, abbreviatae; costae flexuosae; venae obliquae, simplices, brevissimae, usque ad 5 utrinque, indistinctae. Sori remoti, costae plus minusve approximati, ad venas terminales; capsulae nudae, pilis paucis intermixtae.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 299/S).

Polypodium Cesatianum, Bk., Journ. of Bot., XVII, 42 (nom. nud.); v.A.v.R., Mal. Ferns, 603.

Rhizoma albido-(vix caesio-)pruinosum; squamulae deciduae, nigrofuscae, sursum integerrimae, deorsum irregulariter eroso-denticulatae; stipites (in speciminibus exsiccatis nostris) olivaceo-fusci; rachis supra canaliculata, subtus teres; pinnae horizontales, margine in sicco recurvatae, partim integerrimae, partim latissime levissimeque crenulatae, inferiores regulariter vel irregulariter abbreviatae, infimae ± $^1/_3-^2/_3$ longitudinis centralium metientes et ad stipitem leviter decurrentes.

It may be possible that the plants gathered by Beccari (the non-described original P. Cesatianum *Bk.*) and Hallier (described by me as P. Cesatianum *Bk.*) are not identical and that the former fits Copeland's diagnosis and plate of P. coloratum (Philipp. Journ. Sci., III^{C}, 347, tab. VI). After the descriptions and the plate mentioned, however, Hallier's

No. 3312 (consisting of 2 separate fronds, each with a portion of the rhizome) seems to me to be different from that of Hewitt (P. coloratum *Copel.*). My description of P. Cesatianum was based on Christ's determination of Hallier's plant, as is mentioned in Mal. Ferns, and, as long as I have not seen Beccari's specimen, I have no reason to pretend apodictically that Chirst, intentionally or inadvertently, determined the former erroneously.— See Copeland's information in Philipp. Journ. Sci., XII^{c}, 62 — 63.

Polypodium tenuisectum, Bl., Enum. Pl. Jav., II, 134; v.A.v.R., Mal. Ferns, 612.

Also in *Sumatra* (*Mt. Talamau*, H.A.B. Bünnemeijer No. 911).

Polystichum obtusum, J. Sm., Journ. of Bot., III, 412; v.A.v.R., Mal. Ferns, 166; Suppl. I, 141.

Var. sumatranum: Formae typicae subsimile sed frondibus minoribus, usque ad ± 25 cm. longis; pinnis centralibus maximis, usque ad 4 cm. longis, basi usque ad 1$^{1}/_{2}$ cm. latis; pinnis inferioribus paullo abbreviatis; squamis pallide ferrugineis, maximis lanceolatis, longe tenuissime acuminatis. — *Sumatra* (*Mt. Merapi*, H. A. B. Bünnemeijer No. 1277).

Polystichum papyrifolum, v.A.v.R.

Stipites usque ad 25 cm. vel plus longi, cum rachide pallide fusci et squamosi, pius minusve glabrescentes; squamae subferrugineae, crispatulae, partim parvae et subfiliformes, partim relative longae, subulato-lanceolatae, irregulariter lacerato-ciliatae. Frondes elongato-lanceolatae vel -ovatae, ± 50 — 60 cm. longae, acuminatae, 2-pinnatae. Pinnae ± remotae, petiolulatae, e basi lata subulato-lanceolatae, mediales vel inframediales maximae, usque ad 15 — 17$^{1}/_{2}$ cm. longae, basi oblique et inaequaliter truncato-cuneata ± 2$^{1}/_{2}$ — 3 cm. latae, acuminatae, rachide straminea, parce filiformi-squamlosa. Pinnulae papyraceae, glabrae, laterales obliquae, approximatae vel paullo remotae, infra pinnulam terminalem subulatam, serrato-lobatam usque ad 15 — 20 utrinque, lanceolato-rhomboideae; pinnulae superiores confluentes, ceterae subpetiolulatae, infimae anticae maximae, usque ad 2$^{1}/_{2}$ cm. longae et $^{3}/_{4}$ cm. latae, apice obtusiusculae vel acutae, denticulatae, (serrulato-crenatae), semifacie superiore ad mediam falcato-serratae (non spinuloso-serratae), basi cuneata lobatae vel pinnatifidae, semifacie inferiore falcato-serratae (non spinuloso-serratae), basi anguste cuneatae; segmenta antica inferiora apice rotundato vel oblique truncato denticulata (serrulato-crenata), antica infima maxima, ± auriculiformia, non raro libera et cuneato-obovata; venae subdistinctae. Sori mediales; indusium caducum.

Ceram (*Hatoemete Pass*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 628).

Pteris talamauana, v.A.v.R.

Eupteris, Bipinnatifidae. — Rhizoma breve, erectum; squamulae lineari-subulatae, castaneae vel obscure fuscae. Stipites fasciculati, ± 10 — 20 cm. longi, in sicco straminei, juveniles breviter fibrillosi vel puberuli et certe basin versus parce squamulosi, mox glabrescentes et basibus persistentibus pilorum squamularumque punctulato-asperuli, punctulis minutissimis punctis paucis sparsis majoribus intermixtis. Frondes 3 — 5-foliolatae. Pinnae papyraceae, glabrae; pinna apicali petiolata, elongato-triangulari-lanceolata, 10 — 15 cm. longa et $3^1/_2$ — 6 cm. lata, apicem subcaudatum versus sensim angustata, profunde pectinato-pinnatipartita, hinc inde basi 2 — 3-furcata; pinnae laterales subsimiles sed minores, erecto-patentes, infimae breviter petiolatae, basi postica furcatae; costae costulaeque supra spinulosae. Lobi approximati, subhorizontales vel patentes, maximi usque ad 4 cm. longi, 3 — 5 mm. lati, integerrimi vel obscure repandi, apice obtusi vel indistincte mucronulati, imfimi ad petiolos breviter abrupte decurrentes; venae distinctae, erecto-patentes, furcatae. Sori apicem et basin loborum fere attingentes; indusium pallidum.

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 367; *Mt. Dempoe,* E. Jacobson).

Pteris melanocaulon, Fée, Gen. Fil., 5e Mém., 127; v.A.v.R., Mal. Ferns, 358.

Also in *Ceram* (L. Rutten's Explor. Commiss., Coll. Kornassi, *Toekoe* No. 63, *Waï Minawat* No. 1034)

Pteris silvatica, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 53.

Eupteris, Compositae, Bipinnatifidae. — Rhizoma repens, crassum, squamis subulatis, fuscis, deciduis ornatum. Stipites pluriseriati, approximati, usque ad 75 cm. longi, cum rachide (et costis subtus) rufo-fusci et parce minuteque punctulato-asperuli, basin obscure castaneam versus parce decidueque squamulosi. Frondes ± 35 — 45 cm. longae. Pinnae herbaceae, glabrae, costa supra straminea et remote minuteque spinulosa; pinna terminalis lanceolata, ± 15 cm. longa, 4 — 5 cm. lata, pinnatifida, apice subulato-caudata, costa proportione late alata; pinnae laterales ± 5 — 6 utrinque, cum pinna terminali similes sed inferiores sensim majores, usque ad 30 cm. longae et 6 cm. latae, subpatentes ad suberectae, inferiores petiolatae, infimae basi antica furcatae. Lobi conferti vel basibus paullo dilatatis subremoti; lobi centrales majores, centrales postici interdum maximi, usque ad $3^1/_2$ cm. longi, basi $^3/_4$ — 1 cm. lati; pinnarum inferiorum lobi infimi decurrentes; lobi steriles serrulato-crenati, apice obtuso vel rotundato serrulati, fertiles apice sterili serrato-dentati; venae furcatae, superiores simplices, inferiores interdum 2 × furcatae. Sori proportione breves, $^1/_4$ — $^1/_2$ partem superiorem loborum non occupantes.

Pt. longipinnula Wall. var. sumatrana is but a somewhat irregularly lobed form of this.

Sumatra (*Huta Waju?* Hagen), *Java* (*Mt. Malang*, Raciborski; *Mt. Bèsèr*, C. A. Backer No. 21606).

Stenochlaena abrupta, v. A. v. R., Mal. Ferns & All., Suppl. I, 429.

Fertile pinnae to 10 cm. (not 10 mm.) long.

Syngramma Boerlageana, v.A.v.R., Bull. Dép. Agr. I. N., *1908*, XVIII, 19, tab. III; Mal. Ferns, 545.

Sori sometimes forked or sparingly connected.

Also in *Ceram* (*Wai Lantabi*, L. Rutten's Explor. Commiss., Coll. Kornassi No. 1241).

Vittaria angustata, v.A.v.R.; *V. angustifolia*, *Bl.* (not *Bk.*), Enum. Pl. Jav., II, 199; v.A.v.R., Mal. Ferns, 555; Suppl. I, 337.

Forma typica: Rhizome scales lanceolate-subulate, brown, tolerably dark. — *Malacca, Sumatra, Java, Borneo.*

Forma nigricans (*V. elongata*, *Sw.*, *var. angustifolia*, Rst. in Nov. Guin., VIII, Bot., 731): Rhizome scales filiform-subulate, blackish. — *New Guinea.*

ISOSPORE LYCOPODIALES.

Lycopodium gedeanum, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 65; this Bull., tab. VIII.

Urostachys, Euselago. — Caules usque ad 30 cm. vel plus longi, erecti vel superne nutantes, simplices vel dichotomi, graciles, foliis inclusis ± $1^1/_4$—2 cm. diametientes. Folia uniformia, laxa, 8-faria (alternatim 4-faria), herbacea, horizontalia vel plus minusve (refracto-)deflexa, subulato-sublanceolata, plana vel supra subcanaliculata, ± 8—10 mm. longa, basi decurrente $^3/_4$—1 mm. lata, acuta vel subacuminata, integerrima vel apicem versus parce indistincteque serrulata, costa sat abscondita. Sporangia in foliis plantae partis superioris axillaria.

Java (*Mt. Gede*, A. Swartz No. 555).

Lycopodium monticolum, v.A.v.R., this Bull., tab. VII; L. reflexum, *Lam.*, Rac., Flor. Btz., I, 238, p.p.; v.A.v.R., Mal. Ferns & All., 33; Suppl. I, Corr., 65.

Urostachys, Euselago. — Caules 10—20 cm. longi, simplices vel dichotomi, breviores erecti, longiores nutantes, graciles, foliis inclusis ± 5—8 mm. diametientes; gemmae prolificae partim adsunt. Folia uniformia, conferta, firmiter herbacea, 8-faria (alternatim 4-faria), horizontalia vel plus min-

usve (refracto-)deflexa, suprema ascendentia, omnia subulata, 3—6 mm. longa, basi decurrente $^1/_2$—1 mm. lata, acuta, integerrima. Sporangia in foliis plantae partis centralis et superioris axillaria.

Originally I considered this to be L. Everetti *Hert.* or a young form of L. australianum *Hert.* — See my information in Mal. Fern All., 33.

Java (Diëng Plateau, C. A. Backer No. 21887; *Mt. Soembing,* J. A. Lörzing No. 19; *Tjinjiroean,* A. Rant & J. J. Smith No. 191; *Garoet,* W. Burck; *Mt. Pangeranggo,...?), Sumatra (Mt. Singgalang,* O. Beccari No. 413).

Lycopodium sumatranum, v. A. v. R.

Urostachys, Euselago. — Caules e basi decumbente erecti, usque ad ± 40 cm. alti, simplices vel dichotomi, parte inferiore foliis inclusis 2—2$^1/_2$ cm., ramis fructiferis 1—1$^1/_2$ cm. diametientes; gemmae prolificae adsunt. Folia sat conferta, 6—8-faria (alternatim 3—4-faria), herbacea, horizontalia vel deflexa, superiora sat ascendentia, sessilia, sat decurrentia, lanceolato-subulata, basin versus non vel vix angustata, integerrima vel apicem acute acuminatum versus leviter et irregulariter serrulata. Sporangia in axillis foliorum normalium sed minorum.

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 804).

Lycopodium miniatum, Spring, Mon. Lycop., I, 28; v. A. v. R. Mal. Fern All., 31.

Forma minor: Shoots shorter, 15—30 cm. long, 4—9 mm. diam. including the leaves; leaves shorter, 3—6 mm. long, 1—1$^1/_2$ mm. broad, sparingly to copiously, minutely serrulate towards the apex.—*Celebes* (*Boeloe Palaka,* E. C. Abendanon).

Lycopodium subfalciforme, v. A. v. R.

Urostachys, Euphlegmaria. — Caules nutantes vel penduli, 35—40 cm. longi, repetite dichotomi. Folia sessilia, sat densa, folia ramulorum ultimorum 4—5-faria, cetera plerumque 6—8-faria, ascendentia; lanceolata vel subovato-lanceolata, integerrima, maxima 10—12 mm. longa, latitudine prope basin cuneatam vel rotundato-cuneatam $^1/_4$—$^1/_3$ longitudinis, apice breviter et acute acuminata, subapiculata. Spicae breves vel elongatae usque ad 12 cm. longae, ramis 1$^1/_2$—2 mm. crassis; sporophylla breviter et late ovata, acuminata, carinata.

Forma typica: Folia subfalciformia, flaccido-coriacea, costa sat abscondita. — *New Guinea* (Branderhorst No. 24).

Forma tenera: Folia sat recta, tenuiora, costa sat distincta. — *New Guinea* (Branderhorst, Nos. 24*bis,* 39), *New Pommern* (Schlechter No. 13775).

Lycopodium minutifolium, v. A. v. R.; *L. coralium, Spring, var. minutifolium,* v. A. v. R., Mal. Fern All., 44.

Urostachys, Euphlegmaria. — Caules nutantes vel penduli, usque ad ± 20 cm. longi, repetite dichotomi, ramis foliis inclusis ± 5 — 6 mm. crassis. Folia sat densa, flaccido-coriacea, 6 — 8-faria, integerrima, breviter et acutissime acuminata, pungenti-apiculata, inferiora subpetiolata, subrecta, lanceolato-subfalcata, superiora erecto-patentia, sessilia, lanceolato-subovata, maxima ± 5 mm. longa, prope basin cuneatam vel rotundato-cuneatam ± $1^1/_2$ mm. lata. Spicae usque ad 6 cm. vel plus longae, solitariae vel 2-nae, simplices vel 1—2 × furcatae, ramis ± $1^1/_2$ mm. crassis; sporophylla breviter et late ovata, acuminata, carinata, in sicco rugulosa.

The description is taken from specimens cultivated in the Buitenzorg Gardens.

New Guinea.

Lycopodium talamauanum, v. A. v. R.

Urostachys, Euphlegmaria. — Folia magna, rigida, breviter pungenti-acuminata. Spicae 3 mm. crassae. — Ceterum L. phlegmaria *L.* (formam typicam) simulans.

The relation between this and L. phlegmaria is as between L. curvatum *Sw.* and L. cernuum *L.*

Sumatra (*Mt. Talamau*, H. A. B. Bünnemeijer No. 814).

Lycopodium horizontale, v. A. v. R., Bull. Btz., *1912*, VII, 30; Mal. Fern All., 42.

Also in *Banca* (*Pangkal Mendo*, H. A. B. Bünnemeijer No. 1977).

Lycopodium cernuum, L., Spec., 1566; Spring, Mon. Lycop., I, 79; v. A. v. R., Mal. Fern All., 47.

Var. sumatranum (v. A. v. R., Mal Ferns & All., Suppl. I, Corr., 67): Folia ascendenti-incurvata, apicem versus erecta, ciliolata, basi crassa; spicae rectae vel curvatae, ± $2^1/_2$ mm. crassae; ramuli ultimi erecti ad penduli, ± 2 mm. crassi.

Sumatra (*Kenali*, P. Cramer).

HETEROSPORE LYCOPODIALES.

Selaginella deflexifolia, v. A. v. R.

Heterophyllum, Monostelicae, Ascendentes. — Caules erecti vel e basi decumbente ascendentes, usque ad basin pinnati, rachide primaria ± $1^1/_2$ mm. crassa, in sicco pallide fusca et supra sulcata, subtus tereti, foliis lateralibus inclusis ± 5—6 mm. lata; pinnae remote pinnatae, pinnulis furcatis vel parce pinnatis; ramuli ultimi usque ad 5 mm. longi, ± 3 mm. lati. Folia heteromorpha; folia lateralia sat oblonga; lateralia caulina leviter deflexa, subremota, valde inaequilatera, usque ad 3 mm. longa et 2 mm. lata, vix spurio-venulosa, obtusa, semifacie superiore pellucido-marginata, minute serrulata, basi latissime rotundato-cordata, semifacie inferiore integerrima vel basi anguste rotundata parce serrulata; lateralia ramulorum ultimorum patentia, sat contigua, magis minusve inaequilatera, usque ad 2 mm. longa, paullo distinctius spurio-venulosa, basi superiore leviter cordata, inferiore rotundato-cuneata; folia intermedia erecta; intermedia caulina contigua, rotundato-ovata vel -obovata, usque ad $2^1/_2$ mm. longa, abrupte longe cuspidata, pellucido-marginata, minute (sed margine exteriore minus copiose) serrulata, basi oblique cordata, basi exteriore valde producta et distincte (sed non valde) hamato-incurvata, cuspide ± $^2/_3$ longitudinis laminae metiente; intermedia ramulorm minora, imbricata, parce serrulata, basi interiore rotundato-cuneata, exteriore rotundato-cordata. Spicae ad ramulos terminales, solitariae, tetragonae, breves, ± $1^1/_2$ mm. crassae; sporophylla deltoideo-ovata, ± 2 mm. longa, breviter cuspidato-acuminata, carinata, minute serrulata, pellucido-marginata; macrosporae flavido-albae, compacte rugulosae, rugulis rectis, flexuosis, ramosis vel reticulatis, gibbis verruciformibus paucis intermixtis, costis apicalibus crista annuliformi cinctis; microsporae flavidae vel albidae, gibbis bacilliformibus, apice incrassatis vel non incrassatis ornatae.

Sumatra (*Bengkoelen, Lebong Simpang,* C. J. Brooks No. 317/S).

Selaginella commutata, *v. A. v. R.*

Heterophyllum, Monostelicae, Ascendentes. — Caules e basi decumbente erecti, usque ad 30 cm. longi vel longiores, parte inferiore simplices vel ramosi, subteretes, fusco-straminei, 2—3 mm. crassi, parte superiore pinnatim ramosi; pinnae ascendentes, flexuosae; pinnulae furcatae vel parce pinnatae; ramuli ultimi foliis lateralibus inclusis usque ad ± 5 mm. lati. Folia ubique heteromorpha; folia lateralia conferta; lateralia caulina horizontalia vel deflexa, oblonga, inaequilatera, subrecta, 5—6 mm. longa, basi 2—3 mm. lata, obtusa vel obtusiuscula, anguste vel indistincte pellucido-marginata, spurie venulosa, semifacie superiore certe basin late rotundatam vel cordatam versus minute serrulata, ceterum integerrima vel subintegerrima, semifacie inferiore integerrima vel subintegerrima, vel ad basin rotundato-truncatam vel abrupte rotundato-cuneatam parce serrulata; lateralia ramulorum ultimorum patentia, subaequilatera, usque ad 3 – 3½ mm. longa, basi oblique rotundato-cuneata; folia intermedia erecta, integerrima vel subintegerrima, longe cuspidata, cuspide circiter longitudine laminae; intermedia caulina subrotunda, 4—5 mm. longa, abrupte cuspidata, basi exteriore producta, hamato-incurvato-auriculata, basi interiore rotundata vel rotundato-cordata; intermedia ramulorum minora, imbricata, oblonga, minus abrupte cuspidata, basi exteriore cordata, auricula rotundata, vix incurvata, basi interiore rotundato-cuneata. Spicae tetragonae, ± 2 mm. crassae; sporophylla subisomorpha, ovata, pellucido-marginata, minute serrulata, carinata, ventralia breviter apiculato-acuminata, dorsalia longe acuminata; macrosporae albidae vel pallide ochraceae, gibbis brevibus vel longis, rectis vel flexuosis, ramosis vel reticulatis rugulosae; microsporae albidae vel pallide ochraceae, gibbis bacilliformibus ornatae.

Sumatra (*Mt. Talamau*, H.A.B. Bünnemeijer No. 649.)

Selaginella venulosa, v.A.v.R.

Heterophyllum, Monostelicae, Ascendentes. — Caules e basi repente erecti vel ascendentes, plus minus 15—25 cm. alti, parte inferiore simplices vel breviter ramosi, ± 2 mm. crassi, in sicco olivacei, sat teretes, parte superiore pinnati vel furcati pinnatique, rachide foliis lateralibus inclusis ± 8—10 mm. lata; pinnae flexuosae, usque ad 10 cm. longae, pinnatae vel furcatae pinnataeque; pinnulae confertae, suberectae, simplices vel furcatae; ramuli ultimi usque ad 2½ cm. longi, ± 6 mm. lati, brevissimi saepe angustiores. Folia heteromorpha; folia lateralia oblique lanceolato-ovata, subfalcata; lateralia caulina approximata, horizontalia, obtusiuscula, inaequilatera, maxima ± 5 mm. longa, 2 mm. lata, liniis cellularum scleroticarum 2 submarginalibus, 2 medialibus spurie venulosa, medialibus interruptis, semifacie superiore minute serrulata, apicem versus integerrima, basi late rotundata, semifacie inferiore integerrima, basi anguste rotundata; lateralia ramulorum ultimorum patentia vel erecto-patentia, maxima 3—4 mm. longa, basi oblique (antice magis sensim, postice magis abrupte) rotundato-cuneata; folia intermedia erecta, ovata; intermedia caulina in liniis 2 separatis seriata, subabrupte cuspidata, pellucido-marginata, minute (latere interiore quam latere exteriore minus copiose) serrulata, basi interiore rotundata, basi exteriore cordato-auriculata, auricula plus minusve distincte hamato-incurvata et rotundata, folia maxima ± 3—3½ mm. longa, cuspide ± ½ longitudinis laminae metiente; intermedia ramulorum imbricata, minora, proportione latius pellucido-marginata, basi interiore rotundato-cuneata, basi exteriore subcordato-truncata, apice magis sensim cuspidato-acuminata. Spicae ad apices ramulorum solitariae, ± 2 mm. crassae; sporophylla ovata, usque ad ± 2 mm. longa, acuta, pellucido-marginata, minute serrulata, carinata;

macrosporae albae, in quoque macrosporangio 2, gibbis plerumque flexuosis, ramulosis vel reticulatis irregulariter rugulosae, apice crista undulata, annuliformi cincta, costis apicalibus deficientibus; microsporae probabiliter desunt.

Banca (*Mt. Menoembing*, H. A. B. Bünnemeijer No, 1456).

Selaginella palembanica, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 67.

Heterophyllum, Monostelicae, Ascendentes. — Caules erecti vel e basi decumbente ascendentes, adulti probabiliter 20 cm. superantes, pinnatim ramosi, rachide primaria in sicco ± 1 — $1^1/_2$ mm. crassa, pallide fusca, angulosa vel sulcata, foliis lateralibus inclusis ± 6 — 7 mm. lata; pinnae ascendentes, usque ad ± 5 cm. longae; pinnulae obliquae, superiores simplices, centrales furcatae, inferiores parce pinnatae; ramuli ultimi breves, 3 — $3^1/_2$ mm. lati. Folia ubique heteromorpha; folia lateralia venula spuria submarginali cincta; lateralia rachidis primariae paullo remota, horizontalia, 3—$3^1/_2$ mm. longa, obtusiuscula vel acutiuscula, semifacie superiore in parte superiore integerrima vel obsolete denticulata, basin productam et conspicue auriculato-cordatam versus relative longi-ciliata, ciliis superioribus subabrupte abbreviatis et dentiformibus, semifacie inferiore integerrima vel obsolete denticulata, basi rotundato-cuneata; lateralia ramulorum ultimorum crebriora, patentia, minora, usque ad ± 2 mm. longa, saepe acutiora, inter venulam spuriam submarginalem et costam venulis spuriis abbreviatis vel interruptis 2 ornata, supra marginem inferiorem versus pilis perbrevibus, spinuliformibus, paucis, sparsis munita, basi oblique rotundato-cuneata; folia intermedia erecta, rotundato- vel oblongo-ovata, pellucido-marginata, cuspidata, cuspide longitudine laminae; intermedia rachidis primariae abrupte cuspidata, margine interiore ciliata, margine exteriore ciliolata, basi semicordata vel oblique 2-auriculato-cordata, basi exteriore producta; intermedia ramulorum ultimorum acuminato-cuspidata vel minus abrupte cuspidata, parce serrulata ad ciliolata, basi oblique rotundata vel rotundato-cuneata. Spicae ad ramulos ultimos terminales et solitariae vel specie 2-nae (i.e. ad ramulos perbreves solitariae), tetragonae, 1 — $1^1/_2$ mm. crassae; sporophylla lanceolato-ovata, acuminata, pellucido-marginata, ciliolato-serrulata, carinata, usque ad $1^1/_2$ mm. longa; macrosporae 2 in quoque macrosporangio, albidae, sat crebre et irregulariter reticulatae vel rugulosae, apice plus minusve applanato crista annuliformi cincto, costis apicalibus carentibus; microsporae flavidae vel pallide aurantiacae, latere basali gibbis bacilliformibus vel acicularibus ornatae.

S. plumea *Spring* var. trichobasis differs from this principally in having the spikes stouter, with 4 macrospores in each macrosporangium.

Sumatra (*Palembang*, Buurman van Vreeden No. 120*).

Selaginella oviformis, v. A. v. R.

Heterophyllum, Monostelicae, Caulescentes. — Caules erecti, 30 – 35 cm. longi, parte inferiore simplices, in sicco straminei vel pallide olivacei, angulosi et sulcati, parte superiore copiose et sat conferte pinnatim ramosi, in circuitu late deltoideo-ovati, ramulis ultimis ascendentibus, foliis lateralibus inclusis ± 2—3 mm. latis. Folia stipitis erecta, inferiora subisomorpha, oblique ovata, sat longe cuspidato-acuminata, minute serrulata, basi leviter oblique rotundata, semifacie interiore latiore, superiora mox heteromorpha; folia partis ramosae heteromorpha; folia lateralia pellucido-marginata, semifacie superiore minute serrulata; lateralia rachidis primariae plus minus horizontalia, remota, oblique et late subfalcato-ovata, maxima ± 5 mm. longa et $2^1/_2$ mm. lata, acuta, indistincte spurie venulosa, basi superiore late rotundata, basi inferiore angustata, semifacie inferiore integerrima vel apicem versus obsolete serrulata; lateralia ramulorum ultimorum ascendentia, conferta, sublanceolato-oblonga, usque ad 2 mm. longa, distinctius spurie venulosa, subacuminata, basi superiore rotundato-cuneata; folia intermedia erecta, pellucido-marginata, minute serrulata; intermedia rachidis primariae remota, oblique subfalcato-ovata, usque ad 3 mm. longa, longe cuspidato-acuminata, basi leviter oblique rotundata, semifacie interiore latiore, cuspide $^1/_2$ longitudinis laminae metiente; intermedia ramulorum minora, approximata vel superiora vix imbricata, subovato-oblonga, basi leviter oblique rotundato-cuneata. Spicae tetragonae, 1 — $1^1/_4$ mm. crassae; sporophylla ovata, longe acuminata, minute serrulata, pellucido-marginata, carinata; macrosporae juveniles albidae, indistincte rugoso-reticulata, sublaeves, costis apicalibus crista annuliformi cinctis; microsporae juveniles pallide aurantiacae, gibbis breviter bacilliformibus ornatae.

Near S. Griffithii *Spring*. — The description is taken from a specimen cultivated in the Buitenzorg Gardens.

Borneo.

Selaginella triangularis, v. A. v. R.

Heterophyllum, Monostelicae, Caulescentes. — Caules erecti, 25 — 30 cm. longi, parte inferiore simplices, teretes, in sicco pallide fusci, sat laeves, parte superiore sat conferte pinnatim ramosi, in circuitu late triangulares; ramuli ultimi foliis lateralibus inclusis ± 3 mm. lati. Folia caulina erecta, isomorpha, triangulari-oblonga, obtusiuscula vel acuta, minute vel obsolete serrulata, apicem versus carinata, basi subaequaliter rotundato-truncata; folia partis ramosae heteromorpha; folia lateralia semifacie superiore minute serrulata, semifacie inferiore integerrima vel apicem versus obsolete serrulata; lateralia rachidis primariae subhorizontalia, paullo remota, oblique subfalcato-ovata, anguste pellucido-marginata, indistincte spurie venulosa, maxima ± $5^1/_4$ mm. longa, ± $2^1/_4$ mm. lata, acuta, basi superiore late rotundata, basi inferiore angustata; lateralia ramulorum ultimorum ascendentia, conferta, subfalcato-oblonga, usque ad $2^1/_4$ mm longa, distinctius spurie venulosa, semifacie superiore distinctius pellucido-marginata, basi superiore rotundato-cuneata; folia intermedia erecta, plus minusve imbricata, leviter oblique ovata, longe cuspidato-acuminata, pellucido-marginata, minute serrulata, basi leviter oblique rotundato-cuneata; intermedia rachidis primariae ± $3^{1}/_{2}$ mm. longa, cuspide fere $^{1}/_{2}$ longitudinis laminae metiente; intermedia ramulorum minora, cuspide proportione paullo breviore. Spicae tetragonae, 1 — $1^{1}/_{2}$ mm. crassae; sporophylla ascendentia, ovata, acuta vel acuminata, pellucido-mariginata, minute serrulata, carinata; macrosporae pallide flavo-fuscae, graciliter reticulato-rugulosae, costis apicalibus crista annuliformi cinctis; microsporae fuscescenti-flavidae, gibbis bacilliformibus vel stipitato-capitatis ornatae.

Near S. Griffithii *Spring.*

Borneo (*Bahangan*, Nieuwenhuis No. 228).

Selaginella minahasae, v. A. v. R., Mal. Ferns & All., Suppl. I, Corr., 68.

Heterophyllum, Monostelicae, Caulescentes. — Caules e basi breviter repente erecti, ± 35 — 40 cm. alti, parte inferiore simplices, stipitiformes, obtuse 4-angulares, sordide pallide fusci, basin versus 2—$2^{1}/_{2}$ mm. crassi, parte superiore crebre pinnatim ramosi, in circuitu deltoidei vel ovati; rachis primaria foliis lateralibus inclusis usque ad 4—5 mm. lata; pinnae ± ascendentes, inferiores ovato-lanceolatae, usque ad ± $17^{1}/_{2}$ cm. longae, basin versus 3-pinnatae; pinnulae usque ad ± $2^{1}/_{2}$ cm. longae, suberecto-patentes; rami tertiarii erecto-patentes, simplices vel saepius furcati vel parce pinnati; ramuli ultimi suberecti, $^{1}/_{2}$ — $1^{1}/_{2}$ cm. longi, $1^{3}/_{4}$—2 (interdum usque ad $2^{1}/_{2}$) mm. lati. Folia stipitis et partis inferioris rachidis primariae isomorpha, sat remota, erecta, appressa, subsubulato-cordata, 3—4 mm. longa, acuta, carinata, copiose minuteque serrulata, basin versus ciliolata; folia ramorum et partis superioris rachidis primariae heteromorpha; folia lateralia subfalcato-ovata, ± ascendentia; lateralia rachidis primariae maxima, 3 — $3^{1}/_{2}$ mm. longa, 1 — $1^{1}/_{4}$ mm. lata, approximata, acuta, semifacie superiore minute serrulata, basin rotundatam versus sensim ciliata, semifacie inferiore integerrima, basi auriculato-cordata, ciliis 2—4 munita; lateralia ramorum sensim minora; ramulorum ultimorum contigua vel leviter imbricata, maxima 1—$1^{1}/_{2}$ mm. longa, sat obtusa, semifacie superiore in parte inferiore solum parce serrulata ciliolataque et basi rotundato-cuneata, semifacie inferiore basi rotundato-truncata non ciliata; folia intermedia erecta; infermedia rachidis primariae sat contigua, subovata, maxima ± $2^{1}/_{2}$ cm. longa, acuta vel acuminata, carinata, minute (non copiose) serrulata, basi interiore angustata, basi exteriore producta, auriculato-cordata, auricula rotundata et ciliis 2 — 4 munita; intermedia ramorum sensim minora; ramulorum ultimorum imbricata, obtusiuscula vel acuta, parce serrulata vel fere integerrima, basi exteriore subcordata vel rotundata, non ciliata. Spicae ad ramulos ultimos terminales et solitariae, tetragonae, usque ad ± $1^{1}/_{2}$ cm. longae, 1—$1^{1}/_{2}$ (adultae usque ad 2) mm. crassae; sporophylla isomorpha, ovata, acuta, carinata, minute serrulata, usque ad 1 mm. longa, juvenilia erecta, adulta patentia; macrosporae juveniles pallide flavido-fuscae vel flavido-albae, indistincte crebre rugulosae; microsporae . . .

Celebes (*Minahasa, Menado,* S. H. Koorders No. 18439*β*).

Selaginella celebica, v. A. v. R., Mal. Ferns & All., Suppl. I, Corr., 69.

Heterophyllum, Monostelicae, Caulescentes. — Caules e basi breviter repente ascendentes vel erecti, ± 35 — 40 cm. alti, parte inferiore simplices, stipitiformes, pallide fusci, obtuse quadrangulares, basi ± 2 mm. crassi, parte superiore sat crebre pinnatim ramosi; rachis primaria foliis lateralibus inclusis usque ad 3—4 mm. lata; pinnae ascendentes, ad ± 10 cm. longae, inferiores 3-pinnatae; ramuli ultimi suberecti, usque ad ± 1 cm. longi et 1—2 mm. lati. Folia stipitis isomorpha, elongato-triangularia, ± $2^1/_2$ mm. longa, acuta, carinata, minute serrulata, basi 2-auriculato-cordata, auriculis hamato-incurvatis, ciliatis; folia partis superioris rachidis primariae et folia ramorum heteromorpha; folia lateralia ascendentia; lateralia rachidis primariae sat remota, subfalcato-ovata, maxima 2—$2^1/_2$ mm. longa, ± 1 mm. lata, acuta, subacuminata, basi rotundato-cordata (sub-2-auriculata), semifacie superiore dimidia superiore integerrima, dimidia inferiore minute serrulata, basin versus sensim ciliata, semifacie inferiore integerrima, basi ciliata; lateralia ramorum subsimilia, sensim minora; lateralia ramulorum ultimorum imbricata, usque ad 1—$1^1/_4$ mm. longa, obtusiuscula, parcius ciliata aut ciliolata et serrulata, basi superiore sat rotundata, inferiore vix cordata; folia intermedia erecta; intermedia rachidis primariae paullo remota, subfalcato-ovata, maxima ± $1^1/_2$ mm. longa, acuminata, carinata, dimidia superiore serrulata, basi ciliata, basi interiore rotundata, exteriore producta, auriculato-cordata, auricula hamato-incurvata; intermedia ramorum sensim minora; intermedia ramulorum imbricata, oblonga, obtusiuscula vel subacuta, parcius serrulata, basi non ciliata, basi interiore rotundato-cuneata, exteriore rotundato-subcordata. Spicae ad ramulos ultimos solitariae et terminales, tetragonae, usque ad ± 1 cm. longae, $^3/_4$ — 1 mm. crassae; sporophylla ascendentia, demum patentia, late ovata, usque ad $^3/_4$ mm. longa, obtusiuscula vel acuta, carinata, minute serrulata; macrosporae flavido-albae, plus minusve reticulato-rugulosae, costis apicalibus crista annuliformi cinctis; microsporae flavidae vel pallide aurantiacae, parte basali gibbis bacilliformibus vel stipitato-capitatis ornatae.

Celebes (*Minahasa, Menado,* S. H. Koorders No. 18442*β*).

Selaginella biformis, A. Br., MS.; v. A. v. R., Mal. Fern All., 147; *S. cupressina, Spring,* Mon. Lycop., II, 113 (not Bot. Zeit., *1838,* I, 211).

Intermedial leaves of the stem or main rachis with the inner base rotundate-cuneate to rotundate, the outer base rotundate to subcordate; sporophylla acute to acuminate.

Var. cataphracta (*?Lycopodium cataphractum, Bl.* [non *Willd.*], Enum. Pl. Jav., II, 267): Sporophylla sublanceolato-ovata, usque ad fere 2 mm. longa; microsporae rugulis confertis, valde irregulariter flexuosis, simplicibus vel ramulosis ornatae; macrosporae . . . — *Java* (*Preanger Regencies, Tjidadap,* B. C. Bakhuizen van den Brink; *Tjisok,* C. A. Backer No. 22463).

The plant described by Spring as *S. cupressina* in Mon. Lycop. (not to confound with *S. cupressina Spring* in Bot. Zeit., which is S. pennula *Spring*) is probably this variety. The type differs in having the sporophylla shorter, ovate, and the microspores provided with bacilliform or stipitate-capitate projections.— See also Hieron., in Leafl. Philipp. Bot., VI, 1993, 2001.

Selaginella apiculata, v. A. v. R.

Heterophyllum, Monostelicae, Intertextae. — Caules repentes, usque ad 10 cm. longae vel longiores, pinnatae, vel furcatae caulibus secundariis pinnatis; rachis primaria straminea, $^1/_4$—$^1/_3$ mm. crassa, foliis lateralibus inclusis $2^1/_2$ — 3 mm. lata; pinnae remotae, alternantes, suberecto-patentes, usque ad 5 cm. longae, vel longiores et in caules novos productae, longiores pinnatae, breviores simplices; pinnulae simplices usque ad $^3/_4$ cm. longae et $1^1/_2$ mm. latae. Folia heteromorpha; folia lateralia ubique remota, obliqua, inaequilatera, subsemiovata; lateralia rachidis primariae $1^1/_4$—$1^1/_2$ mm. longa, usque ad 1 mm. lata, apice minute apiculato-acuminata et obsolete denticulata, semifacie superioriore rotundata, minute serrulata, basi rotundato-cuneata, semifacie inferiore subrecta, subintegerrima vel parce et obsolete minuteve serrulata, basi anguste rotundata; lateralia ramulorum ultimorum similia sed minora, usque ad $^3/_4$ mm. longa; folia intermedia remota vel approximata, erecta, ovata, acuminata, minute serrulata; intermedia rachidis primariae usque ad 1 mm. longa, basi interiore rotundato-cuneata, exteriore rotundata; intermedia ramulorum minora, basi oblique rotundato-cuneata. Spicae ad apices ramulorum solitariae, breviter oblongae, $1^1/_2$ — $1^3/_4$ mm. latae; sporophylla lateralia ± patentia, lanceolata, abrupte apiculata, minute serrulato-carinata; sporophylla intermedia erecta, ovata, acuminata, minute serrulata, carinata; macrosporae sat albidae laevesque; microsporae aurantiacae laevesque.

Near S. bancana *Warb.* and S. karimatae *v.A.v.R.*

Banca (*Mt. Maras,* H. A. B. Bünnemeijer No. 1840).

Selaginella asperulipes, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 70.

Heterophyllum, Pleiostelicae. — Caules e basi repente erecti, 75—100 cm. alti, parte inferiore simplices, stipitiformes, 6—9-stelici, graciliter punctulato-asperuli, in sicco straminei, irregulariter sulcati, basin versus 3 — 4 mm. crassi, parte superiore pinnatim ramosi, foliis axillaribus rachidis primariae late ovatis, subpetiolulatis, usque ad 6 mm. longis et ad vel infra medium usque ad $4^{1}/_{2}$ mm. latis, acutiusculis vel obtusis, basi anguste plicatis; pinnae lanceolatae vel lineari-lanceolatae, ascendentes, usque ad 20 cm. longae, axillis non raro pinnis accessoriis, basi articulatis munitis, rachide foliis lateralibus inclusis ± 7 mm. lata; pinnulae contiguae, valde ascendentes, maximae usque ad 4 cm. longae, simplices vel furcatae, foliis axillaribus elongato-obovatis, basi conspicue 2-auriculatis, auriculis plicatis revolutisve; ramuli ultimi 4 — 6 mm. lati, apicem versus sensim angustati, terminales saepe valde caudiformi-elongati. Folia heteromorpha, integerrima; folia lateralia caulina remota, subpetiolulata, inferiora erecta, superiora erecto-patentia, maxima $3^{3}/_{4}$ — $4^{1}/_{4}$ mm. longa, ± $1^{1}/_{2}$ mm. lata, lanceolato-oblonga, acuta vel acuminata, basi superiore plicato-auriculata, basi inferiore cordata, auricula rotundata; lateralia ramorum patentia vel subhorizontalia, subfalcato-oblonga, basi superiore distinctius decurrente plicato-revoluto-auriculata, basi inferiore subtruncato-rotundata; lateralia rachidum secundariarum ± 4 mm. longa et $1^{1}/_{2}$ mm. lata; lateralia ramulorum ultimorum contigua vel imbricata, maxima 3 — $3^{1}/_{2}$ mm. longa, superiora basi vix plicata auriculataque; folia intermedia erecta; intermedia caulina subpetiolutata, remota, subfalcato-oblonga, maxima ± 3 mm. longa, acuta, basi ± oblique, specie anguste cordata, auriculis minutis, rotundatis, plicatis vel non plicatis; intermedia ramorum sensim minora; intermedia ramulorum imbricata, breviter acuminata, basi valde oblique lateque adnata, basi exteriore producta et rotundata vel leviter cordata. Spicae ad ramulos ultimos terminales et solitariae, tetragonae, usque ad 2 cm. longae, $1^{1}/_{2}$ — $2^{1}/_{2}$ mm. crassae; sporophylla ovata, acuminata, integerrima, usque ad fere 2 mm. longa; macrosporae juveniles pallide flavido-fuscae, corpusculis minutis, tuberculiformibus vel breviter rugiformibus, calcareis, specie deciduis dense ornatae; microsporae albidae, cristis alaeformibus, reticulatis munitae.

Obi Island (Lieut. P. van Hulstijn's Explor. Excurs., Coll. Sa-anam No. 135).

Selaginella Willdenowii (Desv.), Bk., Fern All., 93; v. A. v. R., Mal. Fern All., 214; *Lycopodium Willdenowii, Desv.*, Hk. & Grev., Ic. Fil., tab. LVIII.

Lateral and intermedial leaves more or less narrowly pellucid-margined on both sides.

Forma typica: Stems and branches smooth. — *Malaya*; *Cochin-China.*

Var. punctulata: Caules ramique punctulis elevatis minutissimis copiose vel dense saepe postice solum muniti. — *Sumatra* (*Deli, Tandjong Merawa*, J. A. Lörzing No. 3996).

Selaginella vestita, v.A.v.R.

Heterophyllum, Pleiostelicae. — Caules usque ad 50 cm. longi et probabiliter longiores, pinnatim ramosi, in sicco pallide fusci, 3-stelici, cum rachidibus tomentosi et basibus persistentibus pilorum hic illic punctulato-asperuli; pili caulini copiosi, sat longi, curvati vel crispati, ramulorum ultimorum sensim minores, parciores, breviores et recti; pinnae ascendentes, breviter petiolulatae, elengato-lanceolatae, usque ad 25 cm. longae, 8 cm. latae, simpliciter pinnatae; ramuli ultimi ascendentes, conferti, lineari-lanceolati, usque ad ± 5 cm. longi, foliis lateralibus inclusis 8 — 10 mm. lati, apicem versus semsim angustati. Folia integerrima; folia caulina subisomorpha, remota, erecta, appressa, oblique ovato-lanceolata, proportione parva, acuta vel acuminata, basi leviter cordata; folia ramorum heteromorpha; folia lateralia horizontalia vel patentia; lateralia rachidum secundariarum oblique subfalcato-ovata, obtusiuscula vel acuta, semifacie superiore angustissime pellucido-marginata, basi rotundato-cuneata, semifacie inferiore basi subcordato-truncata, folia maxima ± $5 — 5^{1}/_{2}$ mm. longa et 2 mm. lata; lateralia ramulorum ultimorum similia, contigua; folia intermedia erecta, anguste pellucido-marginata; intermedia rachidum secundariarum conferta, oblique ovato-oblonga, breviter acuminata, basi oblique 2-auriculato-cordata, auriculis rotundatis, auricula exteriore producta, folia maxima ± 3 mm. longa; intermedia ramulorum subsimilia, minora, imbricata, paullo longius acuminata, basi interiore leviter cordata aut rotundata ad cuneata. Spicae ad ramulos terminales, 1 — 2, simplices vel ad basin furcatae, ± $1^{1}/_{2}$ mm. crassae; sporophylla late ovata, ± $1^{1}/_{4}$ mm. longa, sat acuminata, integerrima, pellucido-marginata, sat carinata, demum patentia; macrosporae pallidae, flavido- vel fusco-griseae, dense et graciliter verruculosae; microsporae flavido-albidae, dense et irregulariter verrucosae, gibbis tuberculiformibus vel breviter cylindraceis, apice saepe incrassatis.

Sumatra (*Mt. Talamau,* H. A. B. Bünnemeijer No. 617).

Selaginella herpocaulos, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 39.

Heterophyllum, Pleiostelicae. — Caules decumbentes, ca 30 — 40 cm. longi, 3-stelici, in sicco straminei et angulosi, pinnati; pinnae parce pinnatae, usque ad 5 cm. longae; pinnulae simplices vel furcatae vel parce pinnatae; ramuli ultimi usque ad 3 cm. longi, foliis lateralibus inclusis 4 — 5 mm. lati. Folia ubique heteromorpha, integerrima, utrinque pellucido-marginata; folia lateralia caulina remota, ascendentia, $3^{1}/_{2}$ mm. longa et fere 3 mm. lata, apice subrotundata et minutissime mucronulata, basi superiore rotundata vel rotundato-cuneata, basi inferiore subcordato-rotundata; lateralia ramulorum ultimorum erecto-patentia vel subpatentia, plus minusve conferta vel imbricata, usque ad $3^{1}/_{2}$ mm. longa et $1^{3}/_{4}$ mm. lata, breviter acuminata, basi superiore rotundato-cuneata, inferiore anguste rotundata; folia intermedia erecta; intermedia caulina remota, oblonga, ± $3^{1}/_{2}$ mm. longa, apice obtusa et breviter mucronata, basi interiore minute auriculata, auricula subacuta, dentiformi, basi exteriore producta, conspicue auriculato-cordata, auricula hamato-incurvata; intermedia ramulorum minora, imbricata, acuminata, semifacie interiore subrecta, basi angustata, semifacie exteriore rotundata, basi rotundata vel subauriculato-cordata. Spicae solitariae, tetragonae, usque ad $2^{1}/_{2}$ cm. longae, 2—3 mm. crassae; sporophylla triangulari-ovata, ± 2 mm. longa, subacuminata, integerrima vel obsolete denticulata, pellucido-marginata, carinata; macrosporae nigro-fuscae, plus minusve albido-pruinosae, partim verruculosae, partim gibbis rugiformibus, flexuosis vel ramulosis ornatae; microsporae albidae vel pallide aurantiacae,cristis alaeformibus,reticulatis munitae.

Pinnae sometimes elongated and growing out to new shoots. — Very nearly allied to S. Schildei *Hieron.*

Sumatra (*Singkara*, Teysmann No. 2297).

Selaginella deliana, v. A. v. R., Mal. Ferns & All., Suppl. I, Corr., 71.

Heterophyllum, Pleiostelicae. — Caules (ex sched.) erecti et 70 — 150 cm. alti, parte inferiore probabiliter simplices, parte superiore 4-pinnati, in circuitu ovati, rachide primaria 7—9-stelica, parce foliata, in sicco fusca et irregulariter sulcata, foliis axillaribus inferioribus deltoideis, quam longis paullo latioribus, angulis obtuse rotundatis; pinnae ascendentes, usque ad 20 cm. vel plus longae, maximae laceolato-ovatae vel elongato-triangulares, rachide foliis lateralibus inclusis ± 7 mm. lata; pinnulae clausae, inferiores patentes, pinnulis secundariis furcatis vel parce pinnatis; ramuli ultimi 1—$2^{1}/_{2}$ cm. longi, 4—7 mm. lati, apicem versus angustati. Folia integerrima; folia rachidis primariae subisomorpha, remota, subfalcato-ovato-oblonga, obtusa, basi rotundata; folia ramorum heterompha; folia lateralia patentia; lateralia rachidum secundariarum subremota, subfalcato-ovato-oblonga, obtusa, semifacie superiore anguste pellucido-marginata, basi superiore rotundata, basi inferiore subcordato-truncata, folia maxima ± $4^{1}/_{2}$ mm. longa, 2 mm. lata; lateralia rachidum tertiarium subsimilia, paullo minora, basi superiore subauriculato-plicata; lateralia ramulorum ultimorum usque ad $3^{1}/_{2}$ mm. longa et $1^{1}/_{4}$ mm. lata, utrinque anguste pellucido-marginata, basi superiore non vel vix plicata; folia intermedia erecta, pellucido-marginata; intermedia rachidum secundariarum paullo remota, oblique subfalcato-ovato-oblonga, obtusa, basi interiore angustata, basi exteriore producta, rotundato-cuneata vel subrotundata, folia maxima ± 3 mm. longa; intermedia ramulorum imbricata, minora, obtuse et breviter acuminata, basi oblique et late adnata, basi exteriore rotundato-cuneata vel cuneata. Spicae ad ramulos solitariae et terminales, usque ad $1^{1}/_{2}$ cm longae, 1 — $1^{1}/_{2}$ mm. crassae; sporophylla late deltoideo-ovata,breviter et obtuse acuminata, integerrima,carinata, macrosporangiorum ± $1^{1}/_{2}$ mm. longa, cetera minora; macrosporae pallide ochraceae, latere rotundato asperulae, gibbis aequatorialibus tuberculiformibus, ceteris rugiformibus, brevibus vel longis, rectis vel flexuosis, ramosis vel connatis; microsporae albidae vel flavidae, latere rotundato gibbis liberis vel connatis, irregulariter et plus minusve grosse tuberculiformibus vel bacilliformibus ornatae.

Sumatra (Deli, Sibolangit, J. A. Lörzing No. 4210)

Selaginella robustipes, v.A.v.R., Mal. Ferns & All., Suppl. I, Corr., 72. *Heterophyllum, Pleiostelicae.* — Caules erecti, probabiliter usque ad 60—75 cm. alti, parte inferiore simplices, stipitiformes, in sicco sordide straminei, irregulariter sulcati, basin versus 3 — 4 mm. crassi, parte superiore pinnatim ramosi, foliis axillaribus rachidis primariae magnis, ovatis, usque ad 6 mm. longis et 4 mm. latis, ad vel infra medium latissimis, acutis vel breviter acuminatis; pinnae ovatae vel lanceolatae, ascendentes vel patentes, centrales maximae, usque ad 15—25 cm. longae, 2-pinnatae vel sub-3-pinnatae, non raro pinnis accessoribus axillaribus basi articulatis munitae; rami tertiarii suberecti, simplices vel furcati vel interdum subpinnati; ramuli ultimi 1—3 cm. longi vel terminales valde elongati caudiformesque, foliis lateralibus inclusis 2—3$^1/_2$ mm. lati, a basi apicem versus sensim angustati. Folia heteromorpha, integerrima, anguste pellucido-marginata; folia lateralia caulina et partis inferioris rachidis primariae horizontalia, remota, subpetiolulata, subfalcato-oblonga, acuta vel acutiuscula, maxima 5—5$^1/_2$ mm. longa et 2—2$^1/_4$ mm. lata, basi superiore rotundata, plicata, inferiore rotundato-cordata; lateralia ramorum et partis superioris rachidis primariae sensim minora et minus remota; lateralia rachidum secundariarum basi superiore rotundato-cuneata et conspicue plicato-revoluto-auriculata, basi inferiore rotundato-truncata; lateralia ramulorum contigua, ascendentia, maxima 2—2$^1/_2$ mm. longa, inferiora distincte sed superiora non vel vix plicata; folia intermedia erecta; intermedia caulina subpetiolulata, lanceolata, usque ad ± 5 mm. longa, acuta, basi interiore rotundata, exteriore vix producta, subcordata, auricula plicata; intermedia partis ramosae sensim minora et minus remota; intermedia ramulorum imbricata, semiovata, subfalcata, breviter acuminata, distinctius pellucido-marginata, semifacie interiore recta, exteriore rotundata, basi valde oblique adnata, extus anguste cuneata. Spicae ad ramulos ultimos terminales et solitariae, tetragonae, usque ad ± 2 cm. longae, 1$^1/_2$—2 (adultae usque ad 3) mm. crassae; sporophylla suberecta, demum patentia, ovata, acuminata, integerrima, pellucido-marginata, carinata, ventralia usque ad 2 mm. longa, dorsalia paullo minora; macrosporae flavido-albidae, dense et graciliter verruculosae; microsporae flavido-albidae, gibbis tuberculiformibus, bacilliformibus vel capitato-clavatis, liberis vel interdum lateraliter connatis munitae.

The stipes are 4—5-stelical or 3-stelical with a tendency to become 4—5-stelical, with the steles placed in 4 - 5 planes, i.e. arranged in 1 line from the ventral one to the dorsal one.

Celebes (*Minahasa,* S. H. Koorders Nos. 19761*β*, 19766*β*).

TWO CRITICAL FERN GENERA.

ANGIOPTERIS, Hoffmann.

The nearly inexhaustible abundance of forms of the species of the genus Angiopteris, differing only in trifles and united by intermediates but nevertheless showing in typical specimens such differences that I cannot refer them all to A. evecta, arborescens (= *angustifolia*) and pruinosa, makes the determination of the species of this genus a puzzle rather more difficult than that of the Cyatheaceae, Dryopteris, etc.

In my Malayan Ferns I have tried to fix the hitherto described species in a key. This has been not easy at all, since the Buitenzorg Herbarium did not possess correctly named specimens of all those described and furthermore the completeness of the available material left much to be desired. I had to depend principally on the sober diagnoses which were and still are anything but complete.

Since then several new species have been discovered and described and our Buitenzorg material is now increased so much that, though we have not yet all necessary for an infallible key, I deemed worth while to study the genus for a second time, as far as regards the Malayan species.

After careful perusal I am convinced now that several characteristics, formerly considered as valuable, are futile or nearly so. — F. i.: the shape of the base of the pinnulae, the dimensions, the degree of transparency of the veins and recurrent venules, the shape of the crenatures or serratures of the pinnulae, etc. are of secondary interest. At present I consider more important the presence or absence of a thin layer of wax on the under side of the pinnulae, their common shape with regard to the proportion between length and width, the presence or absence of recurrent venules which run between the true veins from the margin in the direction of the costa, the marginal or intramarginal arrangement of the sori, the kind and colour of the indumentum if more or less present on the rachises and the under side of the costae and veins, the entireness or denticulation of the pinnulae, etc.

Considering this enumeration of characteristics, treated with more completely in the following key, as a starting point for the limitation of the species, I have tried afresh to fix, with the exception of a few absolutely insufficiently described ones, the other species in the key, which I hope to be in some way fit as a guide in the labyrinth of the (Malayan) species of the genus Angiopteris.

The wanting species (and perhaps also other well inserted ones) are probably merely deviations of the admitted types.

When using my key it should be born in mind:

That the fronds of some species are very large and may reach a length of more than 6 meter;

That the pinnae collected are not always those having the largest pinnulae and that the dimensions given in the diagnoses commonly are those of the largest pinnulae available to the individual authors;

That the noted colour of rachises, pinnulae, costae and veins and the degree of transparency of the veins and venules are taken as a rule from dried material which often shows in the same frond, even in the same pinnula, absolutely opposite characteristics;

That the recurrent venules, apparently wanting when seen in reflected light, may be distinctly visible when examined towards the light.

I could not entirely avoid mentioning in the key characteristics which may be different in the same specimen; they are to be considered as approximate for the normal condition. — F.i.: if one may have found only one pale-coloured pinnula with pale veins among many others of the same frond, which are dark, then the dark colour is to be considered as representing the normal condition.

a. *Pinnulae beneath pruinose or waxy.*
  b. *Largest pinnulae at best 2 cm. broad.*
    c. *Rachises at length black-verruculose by the persistent bases of fallen scales.* (1) A. crinita.
    cc. *Rachises smooth, at least not black-verruculose when destitute of the indumentum.*
      d. *Sori separated from the margin by a space broader than the line of sori.* (2) A. glauca.
      dd. *Sori separated from the margin by a space narrower than the line of sori.*
        e. *Indusium wanting or hardly distinguishable.* (3) A. leytensis.
        ee. *Indusium distinct, consisting of proportionally long hairs or fibres.*
          f. *Pinnulae entire or subentire, at best obsoletely crenulate.* (4) A. Forbesii.
          ff. *Pinnulae distinctly crenulate, serrulate or denticulate.* (5) A. pruinosa.
  bb. *Largest pinnulae at least 2 cm. broad.*
    c. *Pinnulae at best 5 times as long as broad.* (6) A. hypoleuca.
    cc. *Pinnulae at least 5 times as long as broad.* (7) A. ceracea.
aa. *Pinnulae beneath not pruinose or waxy though not rarely minutely pale-punctulate.*

b. *Pinnulae pectinate-serrulate; toothlets cartilagineous.*
(8) A. cartilagidens.

bb. *Pinnulae entire, crenulate, serrulate or denticulate; toothlets not cartilagineous.*

 c. *Main rachis very setose-squamose.* (9) A. ferox.

 cc. *Main rachis not very setose or squamose.*

  d. *Pinnulae subulate-lanceolate or elongate-triangular from a broad base.* (10) A. Teysmanniana.

  dd. *Pindulae linear, linear-lanceolate, linear-oblanceolate or elliptical, the base not or hardly broader than the middle.*

   e. *Recurrent venules absolutely wanting.*

    f. *Pinnulae entire or subentire.*

     g. *Sori absolutely marginal.* (11) A. Brooksii.

     gg. *Sori not marginal.* (12) A. Lorentzii.

    ff. *Pinnulae not entire.*

     g. *Crenulate or crenate.* (13) A. Ruttenii.

     gg. *Not crenulate or crenate.*

      h. *Serrulate or serrate.* (14) A. crassipes.

      hh. *Dentate or denticulate.* (15) A. amboinensis.

   ee. *Recurrent venules present though not rarely short, indistinct or hidden.*

    f. *Pinnulae on stalks to ± 10 mm. long.* (16) A. Presliana.

    ff. *Pinnulae sessile or on stalks to ± 5 mm. long.*

     g. *Pinnulae beneath minutely tomentose throughout.*
(17) A. aphanosorus.

     gg. *Pinnulae beneath naked or at best sparingly chaffy or lanuginoso-squamulose.*

      h. *Pinnulae beneath black-squamulose.*
(18) pallescens.

      hh. *Pinnulae beneath not black-squamulose.*

       i. *Sori absolutely marginal.* (19) A. angustata.

       ii. *Sori not marginal, sometimes apparently so when the margins of the pinnulae are much recurved.*

        k. *Acumen of the pinnulae coarsely serrate throughout; pinnulae conspicuously narrow.*
(20) A. caudata.

        kk. *Acumen crenulate or serrulate, at best serrate at the base, or the pinnulae not conspicuously narrow.*

l. Sori with the capsules very compact, angular even when ripe. (21) A. subintegerrima.

ll. Sori with the capsules not very compact or not angular, except when young.

  ***m.** Recurrent venules short or indistinct, the distinct portion reaching at best to $^1/_2$-way the costa.*

    ***n.** Pinnulae entire or subentire.*

      ***o.** Pinnulae under 2 cm. broad.*

        ***p.** Capsules 8 — 10.* (22*a*) A. Versteegii.

        ***pp.** Capsules 16 — 26.* (22*b*) A. inconstans.

      ***oo.** Largest pinnulae more than 2 cm. broad.* (23) A. elliptica.

    ***nn.** Pinnulae not entire.*

      ***o.** Crenulate.* (24) A. subfurfuracea.*)

      ***oo.** Serrulate or denticulate.* (14) A. crassipes.

  ***mm.** Recurrent venules mostly long, not rarely reaching nearly the costa.*

    ***n.** Pinnulae entire or subentire.*

      ***o.** Sori not reaching the acumen of the pinnulae.* (25) A. Elmeriana.

      ***oo.** Sori continuous to into the acumen.* (26) A. sumatrana.

    ***nn.** Pinnulae not entire though sometimes only shallowly crenulate or serrulate.*

      ***o.** Sori conspicuously remote from the margin, the inner capsules reaching nearly the middle of the veins.* (27) A. ankolana.

      ***oo.** Sori less conspicuously remote from the margin.*

        ***p.** Pinnulae at best ± $1^1/_4$ cm. broad.* (28) A. arborescens.

        ***pp.** Largest pinnulae at least ± $1^1/_4$ cm. broad.*

          ***r.** Pinnulae on stalks ± 4 — 5 mm. long.* (29) A. Willinkii.

          ***rr.** Pinnulae sessile or on stalks at best ± 3 mm. long.*

---

*) *Including A. mutata.*

s. *Pinnulae mostly thin or weak.*
  t. *Pinnulae abruptly subcaudate-acuminate.* (30) A. olivacea.
  tt. *Pinnulae as a rule gradually acuminate or acute.*
    u. *Recurrent venules rather pellucid.* (31) A. grisea.
    uu. *Recurrent venules absolutely impellucid.* (24) A. subfurfuracea.*)
ss. *Pinnulae mostly thick or firm*
  t. *Veins beneath at length commonly dark.*
    u. *Recurrent venules not very distinct.* (28) A. arborescens.
    uu. *Recurrent venules mostly conspicuous.* (32) A javanica.**)
  tt. *Veins beneath mostly pale.*
    u. *Pinnulae to ± $1^1/_2$ cm. broad.* (33) A. crassifolia.
    uu. *Pinnulae at least ± $1^1/_2$ cm. broad.*
      v. *Pinnulae pale.* (34) A. Miqueliana.
      vv. *Pinnulae dark.* (35) A. evecta.

LECANOPTERIS, Blume.

The genus Lecanopteris, which, by the very peculiar habit and arrangement of the sori, has so much attracted the attention of all who have set eyes on it, has also particularly interested me.

After the 2 species (forms) so correctly drawn by Blume's artist (except the rhizome) several others have been found, which, by the incomplete diagnoses and (or) incorrect determinations of later authors (including me too) have much contributed to cause a confusion which makes a correct determination of the present known species and forms difficult though not impossible.

Now, after having seen a living specimen of one of the species and having opportunity to examine, with the exception of 3 species, sufficient though not abundant material of several species or forms, I hope to be able to kindle somewhat more light in the present confusion and to correct my treatment of this genus in the Supplement to my Malayan Ferns and Ferns Allies printed nearly a year ago.

---

*) *Including A. mutata.*

**) *Including A. Hartingiana.*

A great part of our present material is provided with larger or smaller portions of the rhizome, which gives me cause to consider it as an irrefutable axiom, that all the species have a quite similar rhizome, naked, thick, fleshy, creeping, tortuous, the younger parts often covering the older ones, in living state green and glaucous, when dried yellow-brown, grey or black (differences probably due to habitat, age or manner of drying), provided with semiglobose or conical protuberances, at length forming a cavernous crust on and finally surrounding the trunk or the branches of trees, inhabited by ants.

The stipes are placed on the protuberances, at the apex; they are articulated at the base. Fronds oblong or linear-oblong, linear-lanceolate or oblanceolate, deeply pinnatifid, pinnatipartite or pinnate; segments (lobes or leaflets) oblong, linear, ligular-obovate or lanceolate, several to many below an often caudiform terminal one, when barren entire to repando-dentate or repando-subsinuate, when fertile more or less undulated, deeply and obliquely lobed or more shallowly and obliquely repando-sinuate and then bearing on the anterior side of the lobules a smaller or larger lobe- or tooth-like outgrowth, one to each; veins anastomosing irregularly; areolae with free veinlets spreading in various directions. Sori solitary on the ultimate lobules or teeth.

Diels gives in Engl. & Prantl, Nat. Pfl.fam., I^4, fig. 169 for L. carnosa *Bl.* a picture representing the habit of the plant (being a reproduction of the habit-drawing of Burck's plate in Ann. Btz., IV, tab. VII) and detail-drawings of a pinna and a sorus (taken from original specimens). This combination of drawings of different artists and Burck's enumeration of synonyms have led to the conclusion that *Polypodium patelliferum Burck* should be identic with L. carnosa *Bl.* This is only partly correct.

Comparing Burck's plate with that of Blume (Flor. Jav., II, tab. XCIV), we see that in the former the pinnae are blunt with twisted soriferous lobules, so that the soral cavities are directed with the mouth obliquely towards the margin of the segments; in the latter, however, the pinnae are acuminate with the soriferous lobules *not* twisted, so that the retroflexed lobules have the mouth directed upwards. We can observe the same differences when comparing Teysmann's Karimata plant, on which Burck *partly* based his diagnosis of *P. patelliferum,* with our specimens of the true L. carnosa gathered in Celebes, which absolutely agree with Blume's plate. The only resemblance in the material quoted is, that the soriferous lobules of both forms are retroflexed, i.e. turned back on the upper surface of the pinnae.

As to Burck's diagnosis and plate I still observe that Burck used for both as well Teysmann's material as some living plants from Western Java, formerly cultivated in the Buitenzorg Gardens, which might have been specimens of L. carnosa *Bl.*, L. pumila *Bl.* or L. Curtisii *Bk.* — These three species or forms occur in Western Java and Burck's habit-drawing resembles in my opinion too much the last one and not at all the two former.

Consequently it is evident that Teysmann's Karimata plant is *not* identic with L. carnosa *Bl.*

Beccari, Burck and Christ suppose it to be perhaps identic with L. deparioides *Bk.* (*Davallia deparioides Ces.*, Felci e specie nei gruppi affini raccolte a Borneo etc. 33 = *Cyathea deparioides Ces.*, l.c. tab. IV).

Should they be right in this, which only can be made out by comparing Teysmann's plant with that of Beccari, on which Cesati based his diagnosis and plate, then it is conspicuous that Teysmann's plant has nearly exclusively retroflexed soriferous lobules while Cesati's plate shows only non-retroflexed lobules or teeth. Burck also says „soriferous teeth often turned back on the upperside of the frond" although in the mean time he gives detail-drawings of a few non-retroflexed lobules (teeth) resembling those of Cesati.

Consequently it *may* be possible that Beccari, Burck and Christ are right but Burck's information on page 34 l.c., the differences mentioned, the different habitats (Karimata and Sarawak) and other characteristics make it more probable that the species are *not* identic and that Teysmann's plant is a species allied to L. Curtisii and that, so far as one might judge from Cesati's drawing, Beccari's plant is a species allied to my L. philippinensis.

The specific name given by Burck can not be maintained because he includes in his diagnosis and plate at least two different species or their forms.

After boiling a fertile pinna of a species whichever and keeping it for at least one night in concentrated ammonia liquida or a saturated chloral-hydrate solution, we get the surprising result that the soriferous lobules or teeth are rising up little by little till they are more or less upright and placed in a plane perpendicular to the plane of the blade or nearly so but commonly more or less inclined either backwards (inwards in the direction of the costa) or forwards (outwards in the opposite direction); the degree of the inclination may be due to different circumstances as age and habitat or so. This erected or more or less inclining position, *as I have seen also in a living plant*, is the original, natural one.

Drying and pressing a plant for herbarium material it is evident that the soriferous lobules or teeth are pressed down in the direction whither they were at first inclining. When the cavities of those lobules or teeth are narrow or laterally compressed it is as evident that, if not always then at least mostly, they must become twisted and as in the living state the mouth of the cavities is directed obliquely towards the apex of the segment, the mouth of the cavity, when pressed, will also be directed obliquely towards the apex or the margin of the segment. And so we get the retroflexed and non-retroflexed, pseudo-davallioid and pseudo-deparioid sori of our herbarium specimens of Lecanopteris.

I have treated 1 or some segments of all our specimens in the manner mentioned and, after having examined those segments, I was able to fix the hitherto described species as far as we possess dried material, to which, for the time being, I add as dubious species those of which I have seen no material. — The striking differences between the species are demonstrated in tab. IX of this Bulletin.

a. *Sori superficial on the outgrowths (lobules or teeth) of the fertile segments.* (9) L. Macleayi (?).

aa. *Sori immersed in cymbiform, cupuliform, saccate or navicular outgrowths (lobules or teeth) of the fertile segments.*

- **b**. *Soral cavities proportionally broadly cymbiform or cupuliform, not twisted, i. e. with the mouth directed upwards or downwards (when dried).*
  - **c**. *Soriferous outgrowths oblong, remote, rather separated by more than their own width.* (1) L. carnosa.
  - **cc**. *Soriferous outgrowths semiorbicular, approximate, rather separated by less than their own width.* (2) L. Nieuwenhuisii.
- **bb**. *Soral cavities proportionally narrowly saccate or navicular, very generally twisted, i. e. with the mouth facing obliquely the margin or the apex of the segments (when dried).*
  - **c**. *Cavities saccate, about as deep as long.* (5) L. saccata.
  - **cc**. *Cavities navicular, much less deep than long.*
    - **d**. *Sori occupying the upper part of the outgrowths, apparently stalked when seen from the side.*
      - **e**. *Outgrowths horizontally spreading (in dried specimens).* (7) L. philippinensis.
      - **ee**. *Outgrowths oblique or subparallel to the margin of the segments (in dried specimens).* (8) L. deparioides (?).
    - **dd**. *Sori occupying the whole of the outgrowths or even reaching to beyond their bases.*
      - **e**. *Outgrowths as a rule not retroflexed (in dried specimens); areolae with only fine included venules.* (6) L. Curtisii.
      - **ee**. *Outgrowths as rule retroflexed (in dried specimens), or the areolae (at least of the lower half of the segments) provided with a thick recurrent intermedial vein from which the finer included venules are spreading in various directions.*
        - **f**. *Texture thick.* (4) L. davallioides.
        - **ff**. *Texture thin.* (3) L. incurvata (?).

TWO NEW FERN GENERA.

NEMATOPTERIS, v.A.v.R.

Scleroglosso affinis. — Frondes cum rhizomate non articulatae, rigidae, proportione crassae, steriles (cum parte sterili frondium fertilium) non applanatae; venae laterales desunt. Sori lineares, utrinque 1, costae paralleli, in sulcis dorsalibus immersi, parenchymate costali producto separati; paraphyses desunt.

Scleroglossum differs in having the barren fronds and the barren portions of the fertile fronds flattened, the soriferous portions of the fertile fronds proportionally thick, and by the presence of simple or forked lateral veins.

Nematopteris pyxidata, v.A.v.R.; *Scleroglossum pyxidatum, v.A.v.R.*, Bull. Btz., *1914*, XVI, 37, tab. IX.

The defoliate stipes of the two specimens of this species occurring in the Buitenzorg Herbarium were all originally considered by me as to be the stipes of fallen fertile fronds since I could find nothing resembling a sterile frond, as, in all of them formerly examined by me, I found a shallow though distinct groove on the upper side and two still shallower, less distinct grooves on the lower side, which grooves are unmistakably the continuations of those of the fertile fronds, also continued even to the apex of the rather long rostrum (drawn too short in my plate); also the fracture at the apex of the said stipes was easily recognizable. The fertile fronds are, like the fertile portions of those in true Scleroglossum, very thick, even thicker than broad and gradually attenuated (not angustated) towards the base and into the rostrum but so, that the subsemiterete shape of the central portion of the frond is retained.

On only one stipe I found a sound, undamaged, smoothly rounded, terete apical portion about 2 mm. long, without any trace of a fracture and without grooves. Of this portion I have made several transversal sections, which, examined in a saturate chloral-hydrate solution, were all perfectly round. The said tip, hardly thicker than the stipe, was very probably the sole remained barren frond of the two specimens. In true Scleroglossum the barren fronds and the barren portions of the fertile fronds are flat, sometimes apparently terete when in dried material the edges of the fronds are much recurved.

When taking off the produced costal parenchyma which separates the sori, distinct lateral veins may be found in the marginal parenchyma of true Scleroglossum but in *S. pyxidatum* they are absolutely wanting.

Seeing the circumstances quoted above, *S. pyxidatum* can not be maintained as a Scleroglossum, and, as being not referrible to any other known genus, it was inevitable to found on it the new genus Nematopteris.

THYSANOBOTRYA, v.A.v.R.

Sori definiti, ad segmentos fertiles valde contractos dorsales, ad venas longitudinales (vel cristas laterales) utrinque latere costae costulaeve solitarias, seriati. Receptaculum elevatum. Capsulae annulo (annuli Cyathearum more) obliquo completoque. Indusium nullum.

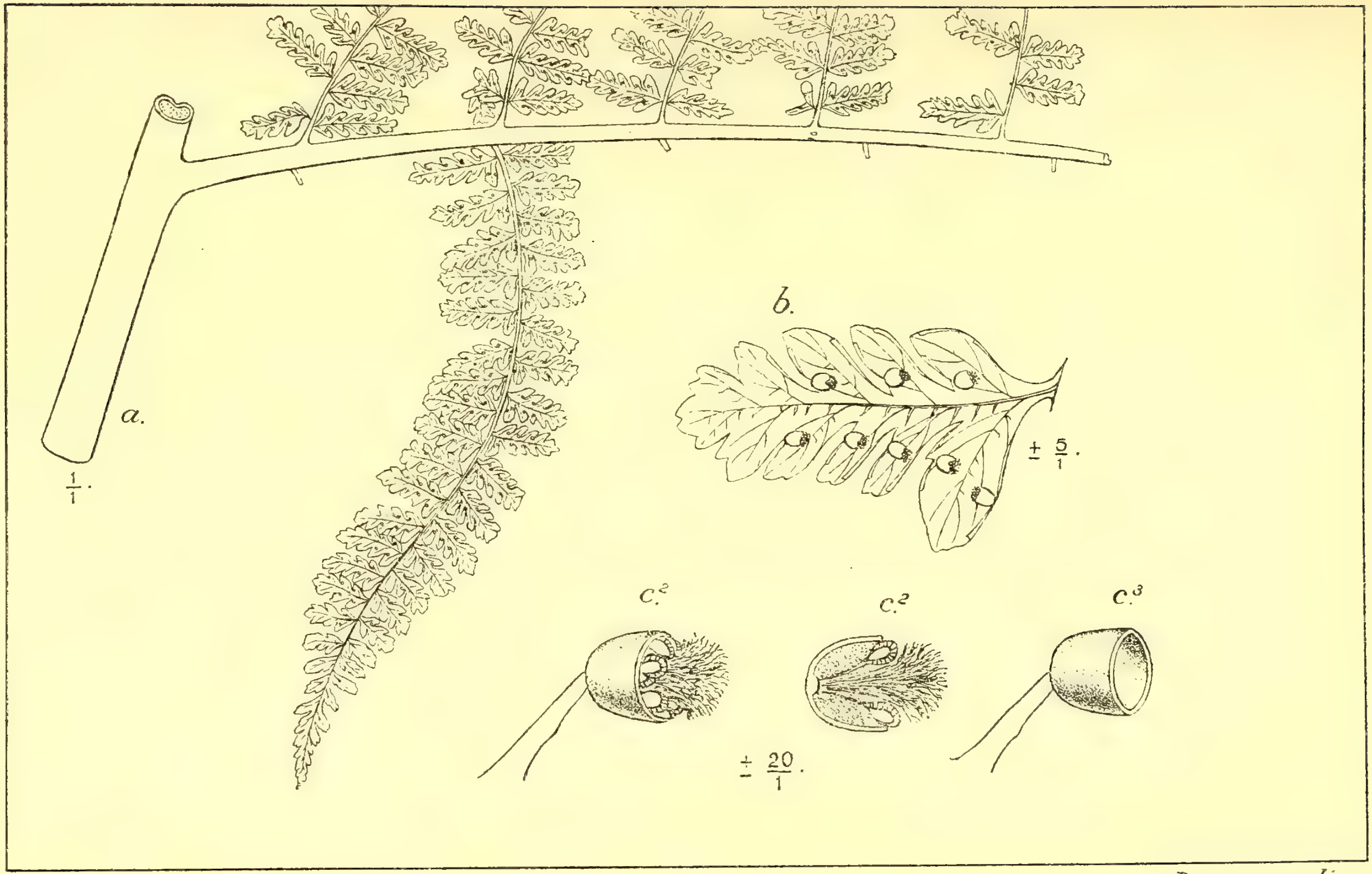
Rhizoma ad truncos arborum scandens. Fasciculi vasorum stipitum probabiliter (rachidum certe) plures, teretes, in orbiculo positi. Frondes pinnatim divisae, dimorphae.

The true systematical place of the genus is uncertain because of incomplete material. The generic name is given in view of the fringe-like sori which, looked at superficially, are in shape intermediate between those of THYSANOsoria and PolyBOTRYA

Thysanobotrya arfakensis (Gepp), v.A.v.R., this Bull., tab. X; *Polybotrya arfakensis, Gepp,* in Gibbs, Contrib., 71.

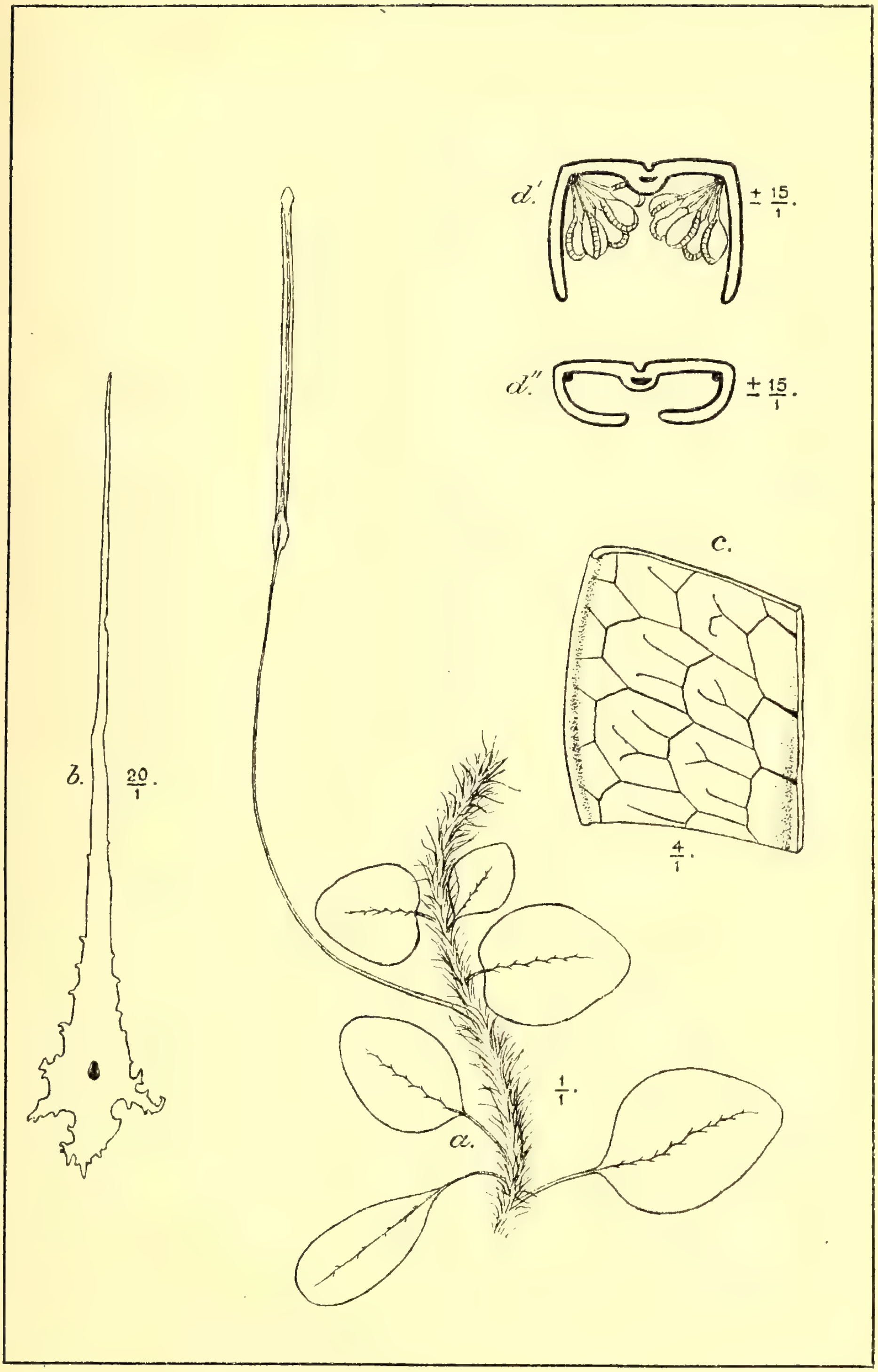
Receptacle orbicular, laterally flattened (nummuliform), perpendicular to the costula, apparently marginal because of the much incurved or inflexed lamina of the ultimate laciniae.

TAB. I.


a.
1/1.
b.
± 5/1.
c.²
c.²
c.³
± 20/1.

Darmosoediro.

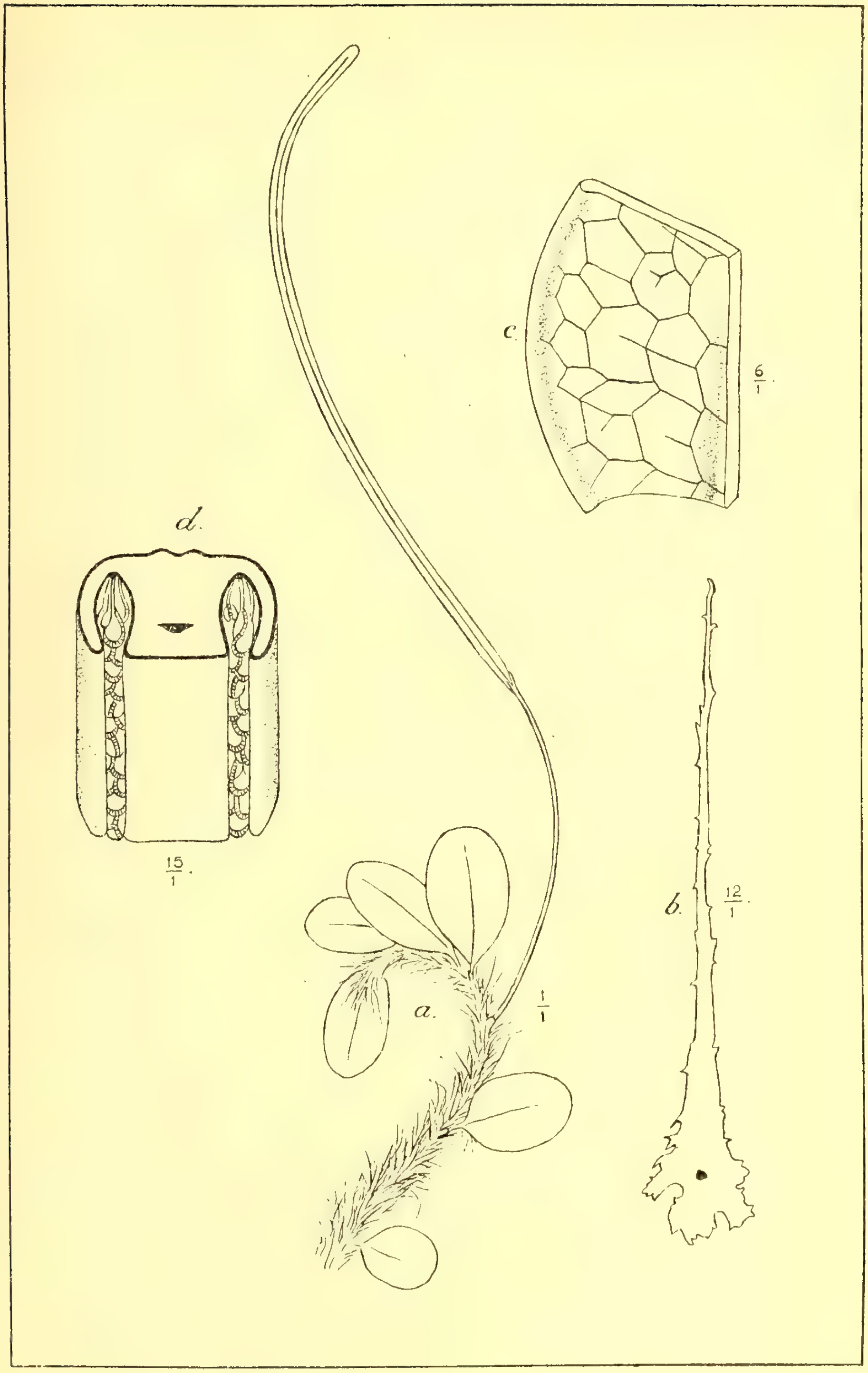
Dennstaedtia penicillifera v.A.v.R.


d.'
± 15/1.
d."
± 15/1.
c.
4/1.
b.
20/1.
1/1.
a.

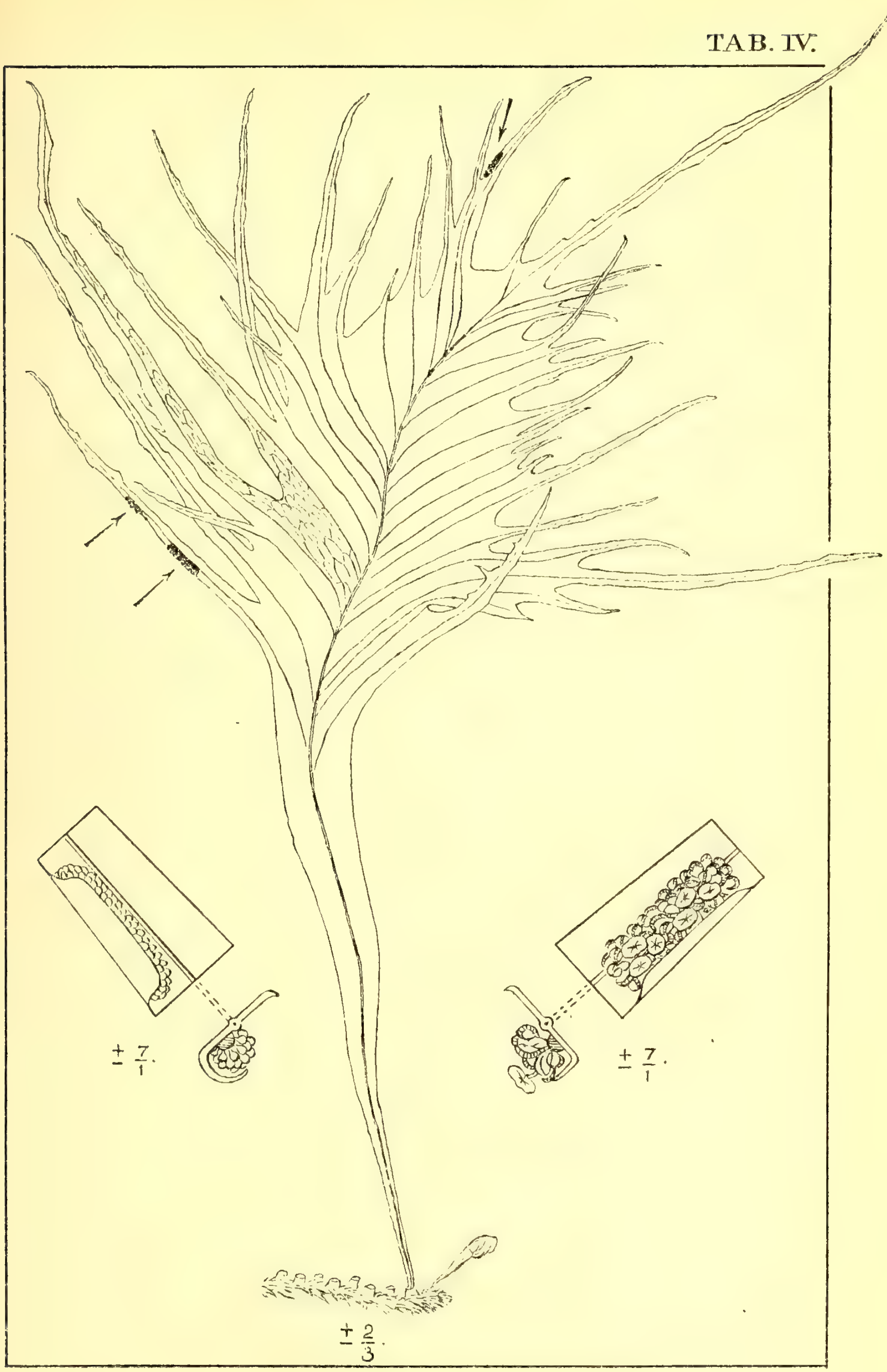
v.A.v.R.

Drymoglossum metacoelum v.A.v.R.

TAB. III.

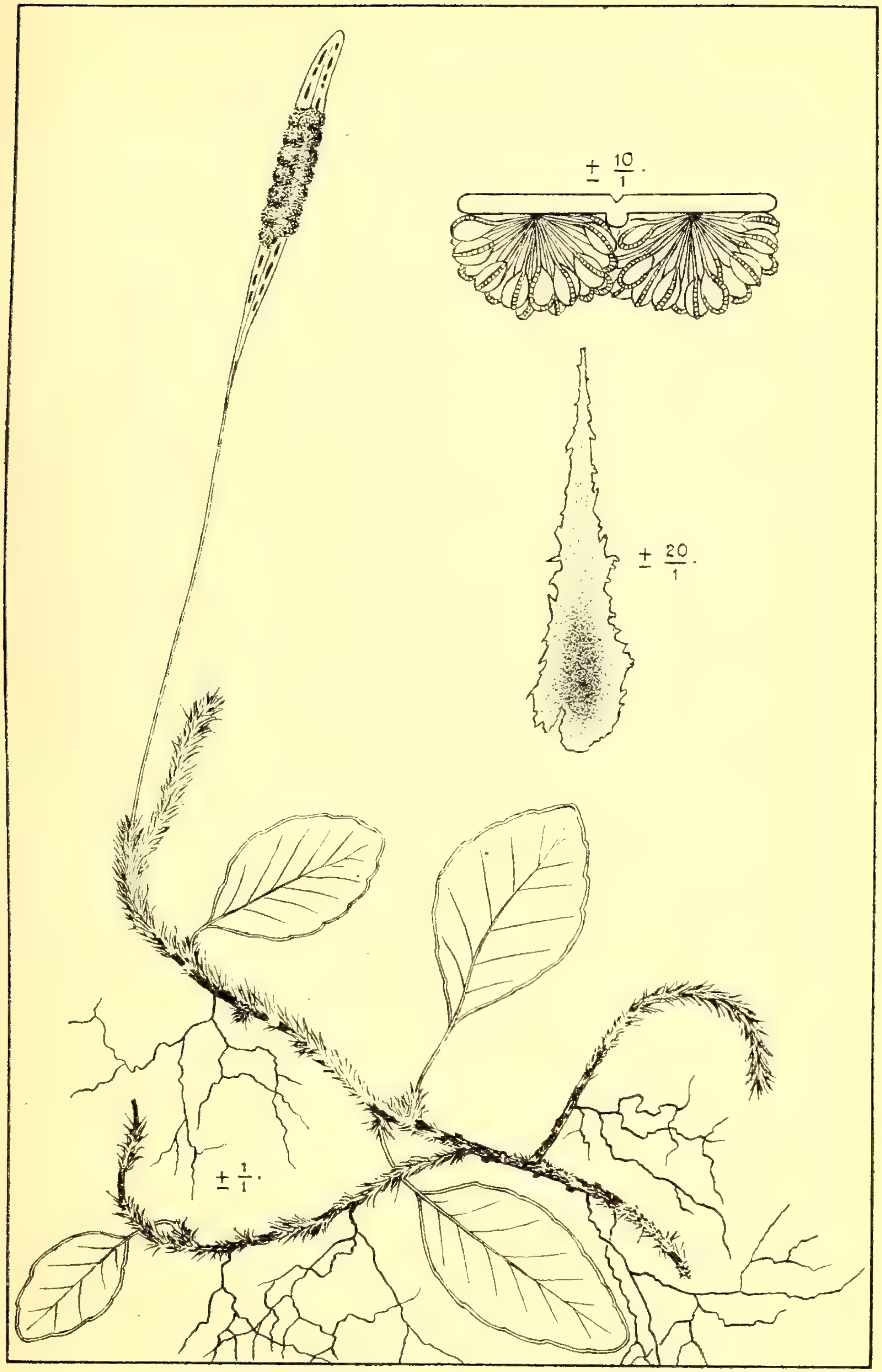

c.
6/1
d.
15/1
b.
12/1
a.
1/1

Drymoglossum tetragonum v.A.v.R.



v. A. v. R.

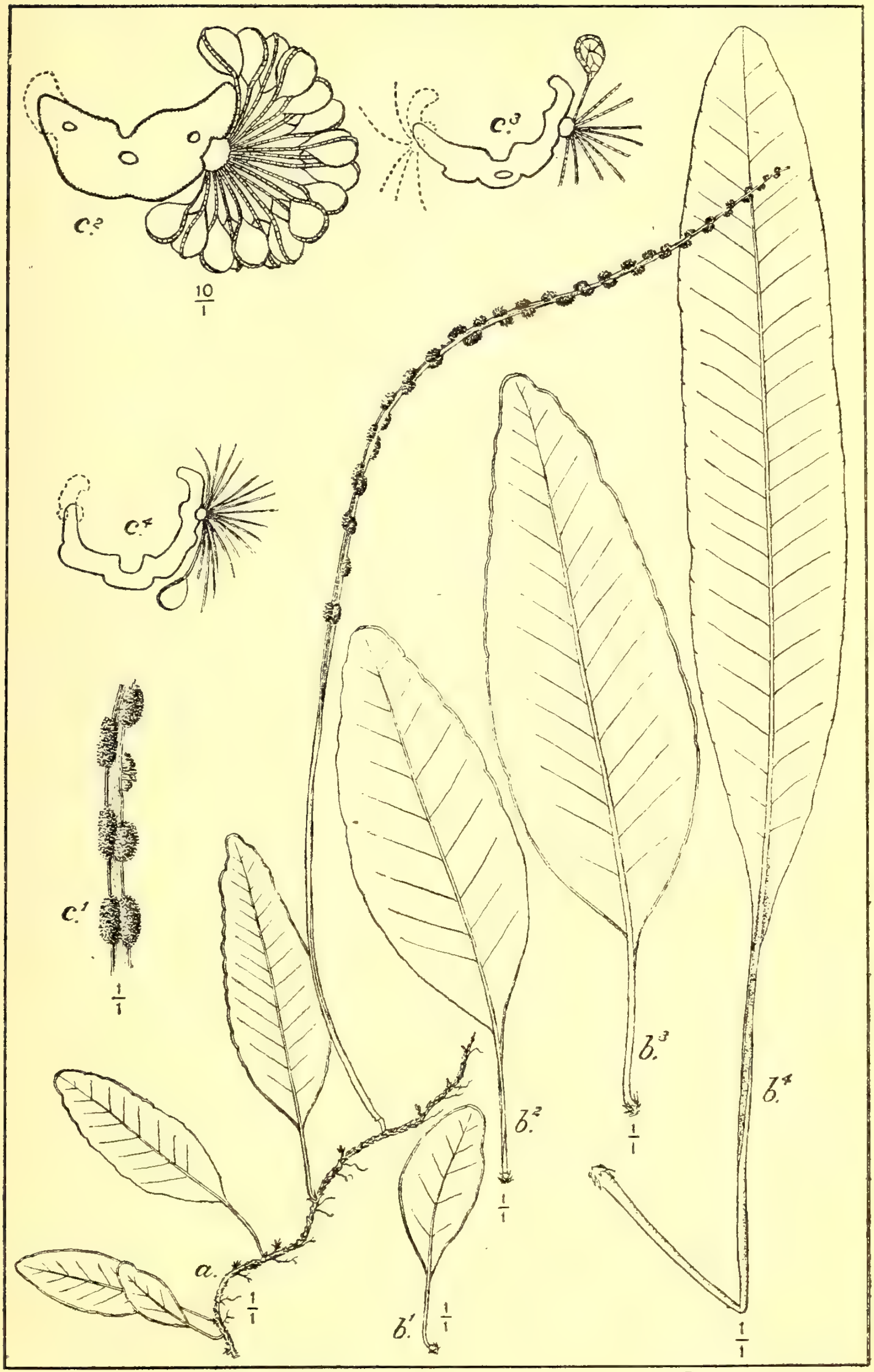
Hymenolepis brachystachys J.Sm. var. mirabilis.



v. A. v. R.

Pleopeltis pseudo-acrostichum, v. A. v. R.

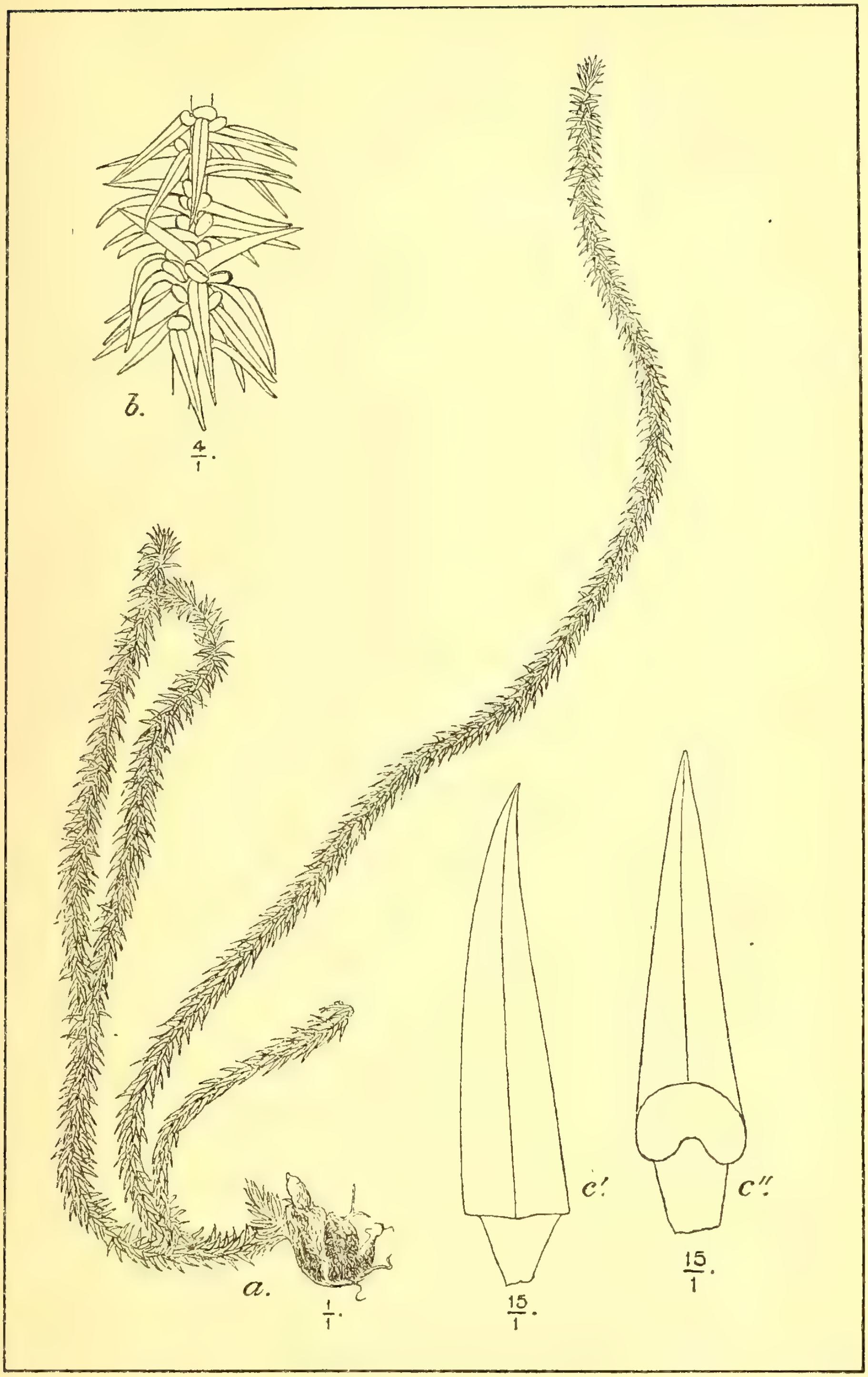
TAB. VI.


c.²
10/1
c.³
c.⁴
c.¹
1/1
a.
1/1
b.¹
1/1
b.²
1/1
b.³
1/1
b.⁴
1/1

Darmosoedira.

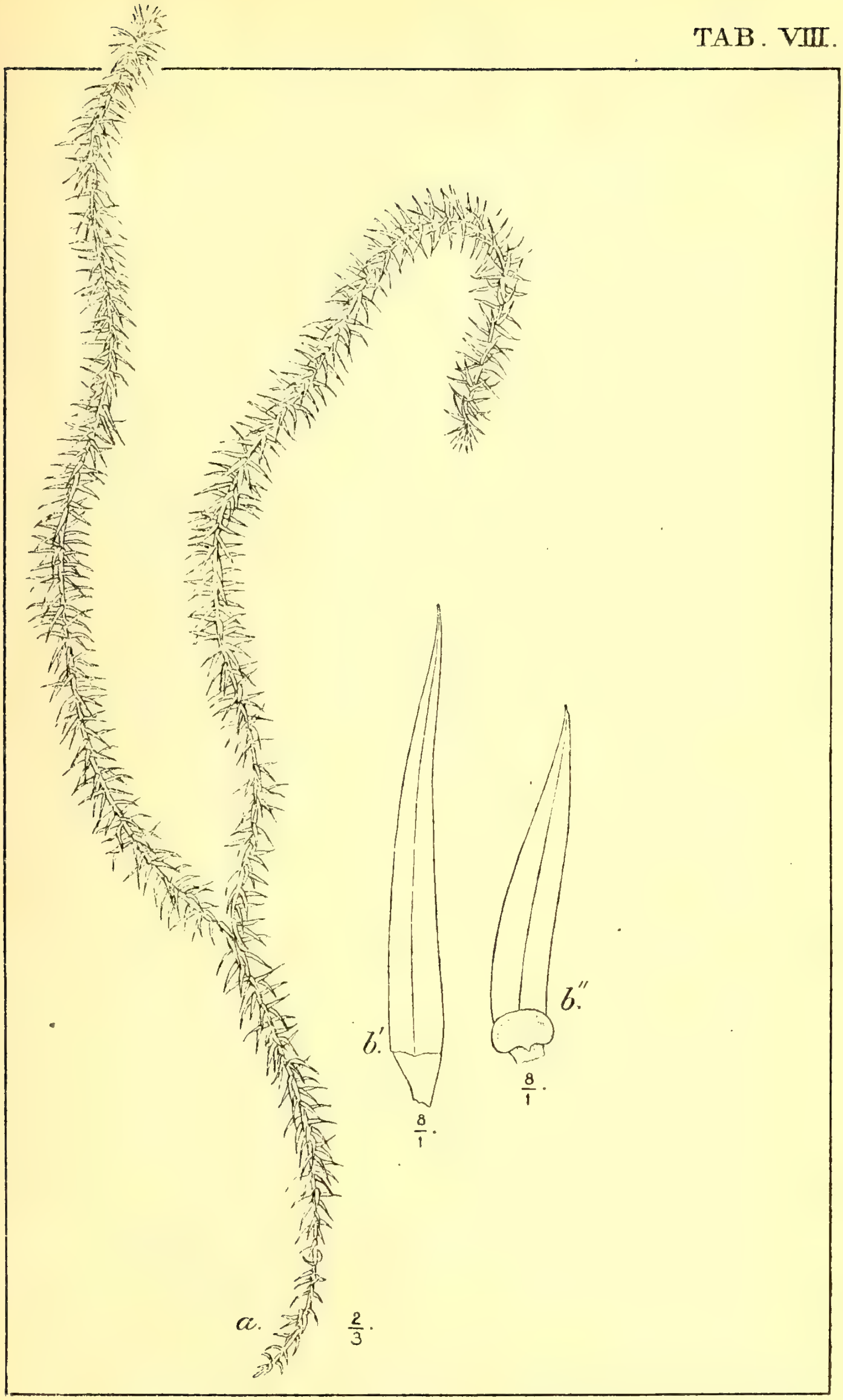
Pleopeltis pseudo-lateralis v.A.v.R..

TAB. VII.


b.
4/1.
a.
1/1.
c'
15/1.
c''
15/1.

Darmosoediro.

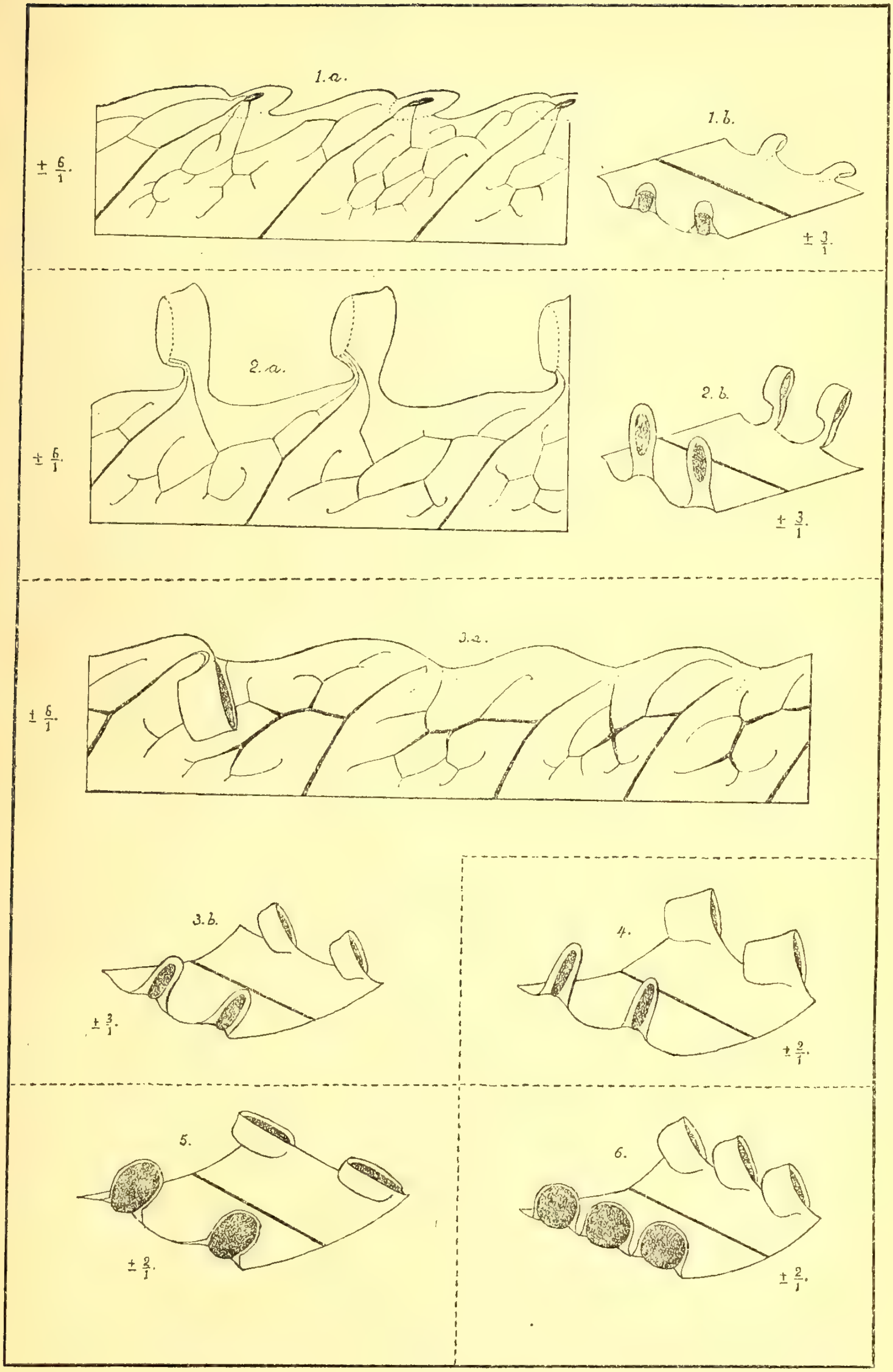
Lycopodium monticolum v.A.v.R.



Darmosoediro.

Lycopodium gedeanum v.A.v.R.

TAB. IX.

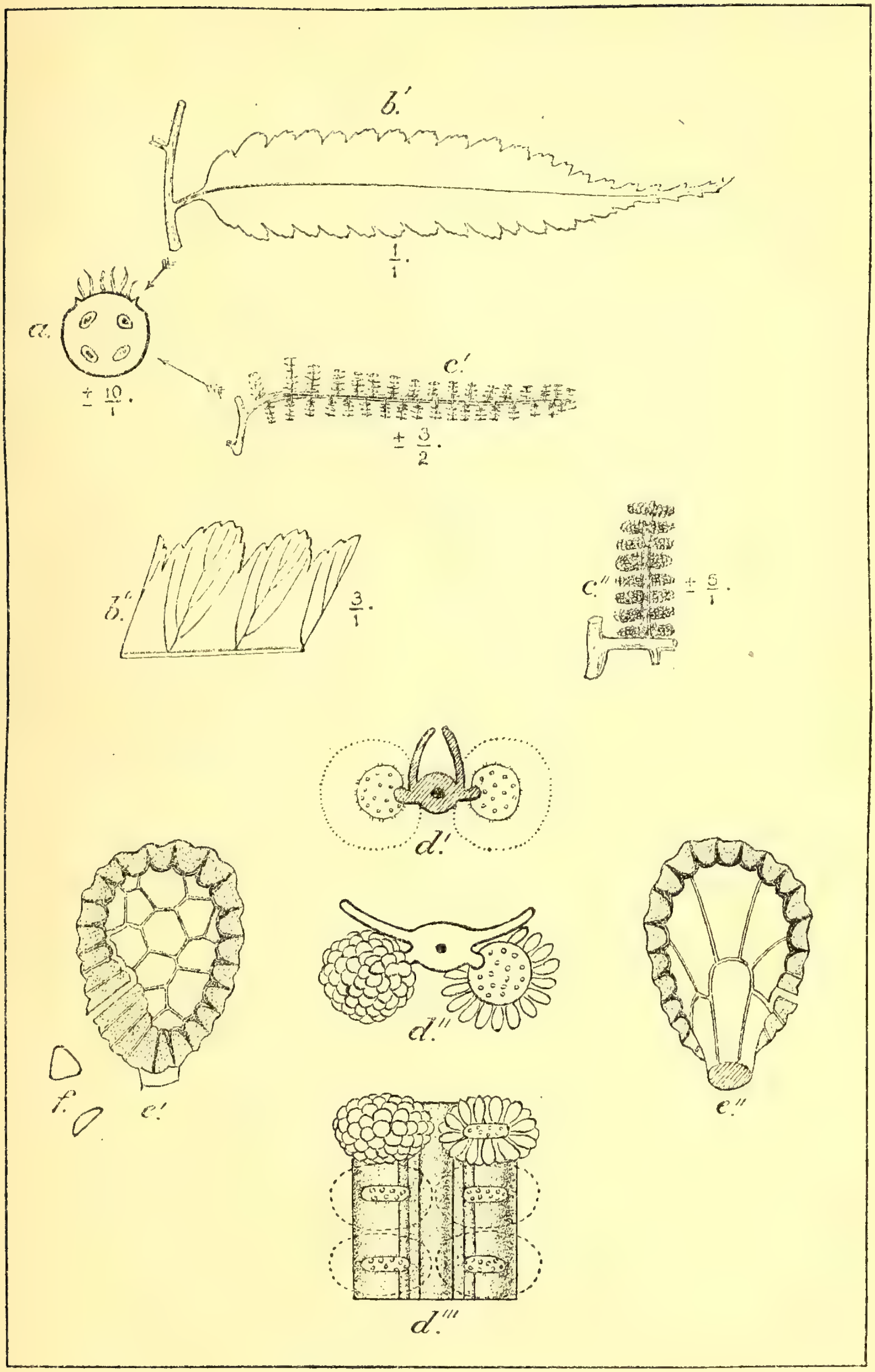

1.a.
± 6/1.
1.b.
± 3/1.
2.a.
± 6/1.
2.b.
± 3/1.
3.a.
± 6/1.
3.b.
± 3/1.
4.
± 2/1.
5.
± 2/1.
6.
± 2/1.

Lecanopteris.

Darmosoediro.

1. *Curtisii*, Bk.
2. *philippinensis*, v. A. v. R.
3. *davallioides*, v. A. v. R.
4. *saccata*, v. A. v. R.
5. *carnosa*, Bl.
6. *Nieuwenhuisii*, Christ.

TAB. X.


b.'
1/1.
a.
± 10/1.
c.'
± 3/2.
b.''
3/1.
c.''
± 5/1.
d.'
d.''
e.'
e.''
f.
d.'''

v. A. v. R.

Thysanobotrya arfakensis v.A.v.R.

Bulletin du Jardin Botanique de Buitenzorg.

Deuxième Série.

No. I. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 3.

„ II. Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. IV.
Dr. E. Rosenstock. Hymenophyllaceae Malayanae.

„ III. W. und J. Docters van Leeuwen—Reynvaan. Einige Gallen aus Java. Sechster Beitrag.
Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels. V.
Dr. J. J. Smith. Vorläufige Beschreibungen neuer Papuanischer Orchideen. V.

„ IV. Dr. A. Rant. Ueber die Djamoer-Oepas-Krankheit und über das Corticium javanicum Zimm.

„ V. Dr. W. Staub. Weitere Untersuchungen über die im fermentierenden Thee sich vorfindenden Mikroorganismen.

„ VI. P. A. Ouwens. On a large Varanus-species from the Island of Komodo.
P. A. Ouwens. On a Chlamydosaurus from Dutch South New Guinea.

„ VII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 4.

„ VIII. Dr. J. J. Smith. Die Gruppe der Collabinae. Noch einmal Glomera Bl. Dendrobium Sw. Sect. Cadetia. Bulbophyllum Thou. Sect. Cirrhopetalum. Die Gruppe der Podochilinae. Neue Orchideen des Malaiischen Archipels. VI. Vaccinium malaccense Wight var. celebense J. J. S. Vorläufige Beschreibungen neuer Papuanischer Ericaceae. Einige Ausbesserungen.

„ IX. Dr. J. J. Smith. Die Orchideen von Java. Dritter Nachtrag.

„ X. H. Karny und W. und J. Docters van Leeuwen—Reynvaan. Beiträge zur Kenntniss der Gallen von Java. 5 Ueber die javanischen Thysanoptero-Cecidien und deren Bewohner.

„ XI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns. 5.

„ XII. C. A. Backer. On some results of the Botanical investigation of Java (1911—1913).

„ XIII. Dr. J. J. Smith. Neue Orchideen des Malaiischen Archipels VII.

„ XIV. Dr. J. J. Smith. Die Orchideen von Java. Vierter Nachtrag.

„ XV. W. und J. Docters van Leeuwen-Reynvaan. Einige Gallen aus Java siebenter Beitrag.

„ XVI. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 6.

„ XVII. Palmiers du Jardin Botanique de Buitenzorg.

„ XVIII. Dr. A. Rant Ueber die Mopokrankheit junger Cinchonapflanzen und über den javanischen Vermehrungspilz.

„ XIX. Andreas Sprecher. Same und Keimung von Hevea brasiliensis.

„ XX. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 7.

„ XXI. W. und J. Docters van Leeuwen-Reynvaan. Niederländisch Ost-Indische Gallen No. 8. Beschreibungen von Gallen aus Sumatra und Simaloer. No. 9. Beschreibungen von Gallen aus Celebes und aus den Inseln südlich von Celebes.

„ XXII. Dr. A. Rant. Der graue Wurzelpilz von Cinchona.

„ XXIII. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 8.

„ XXIV. Capt. C. R. W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 9.

„ XXV. Dr. J. J. Smith. Orchidaceae novae Malayenses VIII.

„ XXVI. Dr. J. J. Smith. Die Orchideen von Java. Fünfter Nachtrag.

„ XXVII. Dr. Th. Valeton Sen. New Notes on the Zingiberaceae of Java and the Malayan Archipelago.

„ XXVIII. Capt. C. R W. K. van Alderwerelt van Rosenburgh. New or interesting Malayan Ferns 10.

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01489 8555